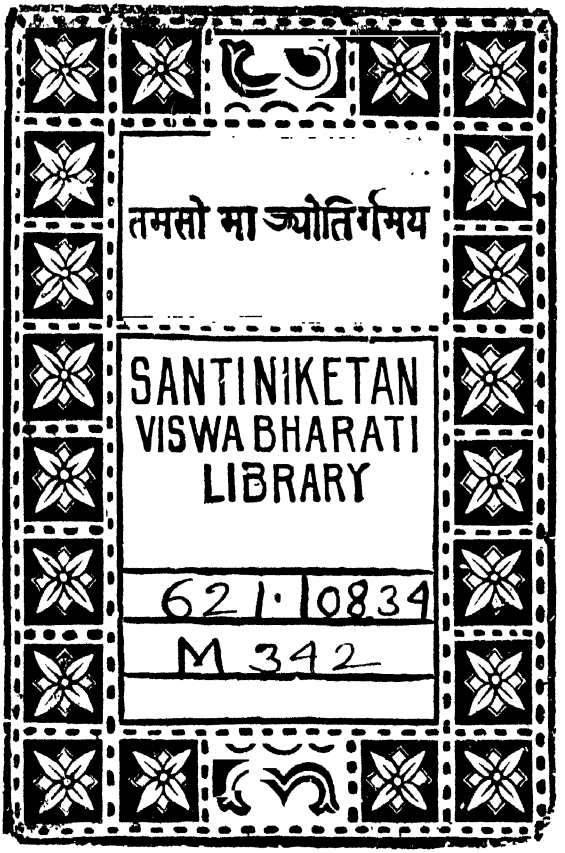
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STEAM TABLES AND DIAGRAMS

MARKS AND DAVIS

TABLES AND DIAGRAMS OF THE THERMAL PROPERTIES OF SATURATED AND SUPERHEATED STEAM

BY

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Twelfth Impression

LONGMANS, GREEN AND CO.
55 FIFTH AVENUE, NEW YORK
39 PATERNOSTER ROW, LONDON, E.C. 4
TORONTO, BOMBAY, CALCUTTA, AND MADRAS

1923

FIRST EDITION JUNE 1909

REPRINTED JUNE 1910

WITH CORRECTIONS, FEBRUARY 1912

REPRINTED MARCH 1913

REPRINTED WITH CORRECTIONS, NOVEMBER 1914

WITH CORRECTIONS, OCTOBER 1916

REPRINTED MARCH 1918

REPRINTED JANUARY 1919

REPRINTED DECEMBER 1919

REPRINTED SEPTEMBER 1920

REPRINTED FEBRUARY 1922

REPRINTED SEPTEMBER 1923

MADE IN UNITED STATES

PREFACE

THE tables of the properties of saturated steam which have appeared up to the present time have all been based upon the classic investigations of Regnault, carried out more than sixty years ago. It has been apparent for some time that the total heats of dry and saturated steam, as determined by those admirable researches, are below the correct values. The great difficulty in obtaining steam which is exactly dry and saturated has not been appreciated until very recently; and it is undoubtedly true that Regnault was investigating steam containing a small amount of moisture when he thought that he was dealing with dry steam. Fortunately, the recent investigations of Dieterici, Smith Griffiths, Henning and Joly give a trustworthy body of new values of the total heat of dry steam at pressures below atmospheric pressure; while the method recently elaborated by Davis, when applied to the throttling experiments of Grindley, of Peake, and of Griessmann, gives remarkably accordant determinations at pressures above atmospheric pressure. The table which we have prepared is based entirely upon these new values, and is probably correct to one tenth of one per cent within the range of steam pressures usual in engineering practice. Regnault's formula gives results which are too high by 18 B. t. u. at 32° F.; too low by 6 B. t. u. at 275° F.; and again too high at 380° F.; the error increasing rapidly at higher temperatures.

The investigations of Knoblauch, of Thomas and of Henning are the necessary basis for any determinations of the properties of superheated steam. These investigations have been subjected to a careful analysis, both as to the probable errors resulting from the methods of experimentation, and also as to the relation of the experimental results to the values deduced from thermodynamic theory, so far as this latter throws any light on the matter. Where the results of the separate investigations are not closely accordant, a critical estimate has been made of the relative values to be given to each, in the region under consideration. The properties of superheated steam are tabulated for every pound pressure, and for every ten degrees of superheat, within a range which exceeds present practice. All the information relating to superheated steam of any pressure is given on one double-page; an arrangement which permits the immediate finding of any desired quantity. Supplementary tables extend the superheated steam table to very high temperatures and give the properties of water, metric conversion factors, Naperian logarithms and other quantities.

Beside the tables, we have prepared two large diagrams showing the properties of saturated and superheated steam. These diagrams can be used, instead of the tables, for finding the total heat, entropy and specific volume of steam of any known quality or superheat (within an extended range); but their chief purpose is to facilitate certain calculations. In consequence of the variation of the specific heat of super-

heated steam with both pressure and temperature, the solution of commonly occurring problems involving superheated steam is either laborious or approximate. If the tables are arranged in such a manner as to aid the solution of problems of one class, they become inconvenient for other purposes. The total heat-entropy diagram, devised by Mollier, makes it possible to solve immediately many of the problems which arise in connection with either saturated or superheated steam. A total heat-pressure diagram, showing specific volumes, permits the solution of problems involving volumes. By the use of the two diagrams, either separately or together, a large number of the steam problems occurring in the design of engines and turbines, or in connection with the flow of steam, or its throttling, can be solved without any calculation. These two diagrams have been plotted with great care from the data given in the tables, and should prove useful to all engineers or students engaged in making calculations which involve saturated or superheated steam.

The authors desire to express their indebtedness to Professor E. V. Huntington for the use of the plates of his four-place tables of logarithms, and to Mr. M. R. Wolfard, S. B., for his patient and skilful assistance in the arduous work of computation and in drawing the diagrams.

L. S. M.
H. N. D

CAMBRIDGE, MASS., December, 1908.

NOTE TO THE 1916 REPRINT. The experimental information which has become available since these tables were computed does not justify any appreciable change in them except in one respect. The work of Holborn and Baumann * on the pressure-temperature relations of saturated steam at high pressures should apparently be accepted in preference to all previous work. The pressures involved are from 400 lb. per sq. in. to the critical pressure and are consequently outside the range of usual engineering experience. The last few entries in Tables 1, 2, 3, and 6 have been changed to bring them into agreement with this new information.

A new Mollier chart has been prepared which will be found to be more convenient than the earlier Diagram I.

L. S. M.
H. N. D.

CAMBRIDGE, MASS., August, 1916.

* Marks, Trans. Am. Soc. Mech. Eng., vol. 33 (1911).

CONTENTS

THE TABLES

OF the three main steam tables, the first and second are for water and saturated steam only, and give explicitly all of the properties that are ordinarily needed. Table 3 is primarily for superheated steam, but includes saturated steam as the special case of zero superheat.

In Table 1, the argument is the temperature. This table is useful for hygrometric and other purposes as well as for steam engineering. To facilitate the handling of condenser vacuums, all pressures below one atmosphere are given in inches of mercury as well as in lbs. per sq. in. The use of this table in accurate calorimetry is made possible by giving the heat of the liquid to hundredths of a mean B. t. u. between 32° and 212°.

The data upon which steam tables must be based are well known only to about 400°. It is, however, often convenient to be able to work roughly at much higher temperatures. Table 1 has, therefore, been extended to the critical point itself, but the values above 400° should not be used with too much confidence (see the discussion of sources in Part III of this book).

In Tables 2 and 3, the argument is the pressure. These tables extend to 600 lbs., the values above 250 lbs. being less certain than those below. Table 3 can be extended to very high superheats by means of Table 4.

There is also a table of boiling points for use in calibrating thermometers, a table of the thermal properties of water, a full set of conversion tables, particularly for energy units, and tables of four-place logarithms, both common and Naperian.

The unit of heat and of energy in these tables is a "mean B. t. u.," that is, 1/180 of the heat needed to raise one pound of water from the freezing to the boiling point. The use of such a unit instead of the B. t. u. at 60° F. corresponds to the rapidly increasing use of the Bunsen or mean calorie in the metric system, and has many advantages, among which is the ease with which tables based on the two mean units can be compared. The most important reason for such a choice in these tables is that, at the present time, the value of the mean unit is better known than that of the 60° unit, because of the rapidity with which the specific heat of water changes with the temperature near 60°. The mean B. t. u. is larger than the 60° B. t. u. by between three and ten *hundredths* of one per cent, a difference that is negligible for engineering purposes.

THE DIAGRAMS

IN order to facilitate the solution of many problems of common occurrence, two large diagrams have been prepared to accompany this book.

The Total Heat-Entropy Diagram (Diagram I) has two families of curves: (*a*) curves of constant pressure, and (*b*) curves of constant quality and constant superheat. The ordinates are total heat (*i. e.* heat of formation measured above water at 32° F.); the abscissæ are entropies. Vertical lines are lines of constant entropy and show the change in the condition of steam during adiabatic expansion. Measurements along vertical lines give the change in the total heat of steam during adiabatic expansion (which is equal to the work done in the Rankine ideal cycle); the same measurements transferred to the velocity scale give the theoretical velocity of escape of steam through a properly shaped orifice or nozzle. Horizontal lines are lines of constant total heat; they show the change in the condition of steam which results from throttling.

The Total Heat-Pressure Diagram (Diagram II) has two families of curves: (*a*) curves of constant specific volume, and (*b*) curves of constant quality and constant superheat. The ordinates are total heats; the abscissæ, pressures. Vertical lines are lines of constant pressure; measurements along vertical lines give the heat supply accompanying changes of volume or quality at constant pressure. Horizontal lines are lines of constant total heat; they show the change of volume and condition of the steam resulting from throttling. The scale of abscissæ is a uniform scale of temperatures of saturated steam, which gives a varying scale of steam pressures. This varying scale has the advantage of spreading out the specific volume curves at low pressures.

The use of total heats as ordinates has certain special advantages. The energy given up by steam that is passing through any appliance is equal to the difference between the total heat of the entering and of the leaving steam. This difference is represented by vertical measurements on the diagram.

The method of using these diagrams for the solution of problems is explained in detail in Part II.

Table 1. Saturated Steam: Temperature Table

Temp. Fahr.	Pressure lbs. per sq. in.	Pressure inches of Hg.	Sp. Vol. cu. ft. per lb.	Density lbs per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or φ	t
32°	0.0886	0.1804	3294.	0.000304	0.00	1073.4	1073.4	1019.3	1019.3	0.0000	2.1832	2.1832	32°
33	0.0922	0.1878	3170.	0.000316	1.01	1072.8	1073.8	1018.6	1019.6	0.0020	2.1777	2.1797	33
34	0.0960	0.1955	3052.	0.000328	2.01	1072.2	1074.2	1018.0	1020.0	0.0041	2.1721	2.1762	34
35°	0.0999	0.2034	2938.	0.000340	3.02	1071.7	1074.7	1017.3	1020.3	0.0062	2.1666	2.1728	35°
36	0.1040	0.2117	2829.	0.000353	4.03	1071.1	1075.1	1016.6	1020.7	0.0082	2.1611	2.1693	36
37	0.1081	0.2202	2725.	0.000367	5.04	1070.6	1075.6	1016.0	1021.0	0.0102	2.1557	2.1659	37
38	0.1125	0.2290	2626.	0.000381	6.04	1070.0	1076.0	1015.3	1021.3	0.0122	2.1503	2.1625	38
39	0.1170	0.2382	2530.	0.000395	7.05	1069.4	1076.5	1014.6	1021.7	0.0142	2.1449	2.1591	39
40°	0.1217	0.2477	2438.	0.000410	8.05	1068.9	1076.9	1014.0	1022.0	0.0162	2.1394	2.1556	40°
41	0.1265	0.2575	2350.	0.000425	9.05	1068.3	1077.4	1013.3	1022.3	0.0182	2.1341	2.1523	41
42	0.1315	0.2677	2266.	0.000441	10.06	1067.8	1077.8	1012.6	1022.7	0.0202	2.1287	2.1489	42
43	0.1366	0.2782	2185.	0.000458	11.06	1067.2	1078.3	1012.0	1023.0	0.0222	2.1234	2.1456	43
44	0.1420	0.2890	2107.	0.000475	12.06	1066.7	1078.7	1011.3	1023.4	0.0242	2.1181	2.1423	44
45°	0.1475	0.3002	2033.	0.000492	13.07	1066.1	1079.2	1010.6	1023.7	0.0262	2.1127	2.1389	45°
46	0.1532	0.3118	1961.	0.000510	14.07	1065.6	1079.6	1010.0	1024.0	0.0282	2.1074	2.1356	46
47	0.1591	0.3238	1892.	0.000529	15.07	1065.0	1080.1	1009.3	1024.4	0.0301	2.1022	2.1323	47
48	0.1651	0.3363	1826.	0.000548	16.07	1064.5	1080.5	1008.6	1024.7	0.0321	2.0970	2.1291	48
49	0.1715	0.3492	1763.	0.000567	17.08	1063.9	1081.0	1007.9	1025.0	0.0341	2.0917	2.1258	49
50°	0.1780	0.3625	1702.	0.000587	18.08	1063.3	1081.4	1007.3	1025.4	0.0361	2.0865	2.1226	50°
51	0.1848	0.3762	1643.	0.000608	19.08	1062.8	1081.9	1006.6	1025.7	0.0381	2.0814	2.1195	51
52	0.1917	0.3903	1586.	0.000630	20.08	1062.2	1082.3	1006.0	1026.1	0.0401	2.0763	2.1164	52
53	0.1989	0.4049	1532.	0.000653	21.08	1061.7	1082.7	1005.3	1026.4	0.0420	2.0712	2.1132	53
54	0.2063	0.4201	1480.	0.000676	22.08	1061.1	1083.2	1004.6	1026.7	0.0440	2.0660	2.1100	54
55°	0.2140	0.4357	1430.	0.000700	23.08	1060.6	1083.6	1004.0	1027.1	0.0459	2.0609	2.1068	55°
56	0.2219	0.4518	1381.	0.000724	24.08	1060.0	1084.1	1003.3	1027.4	0.0478	2.0559	2.1037	56
57	0.2301	0.4684	1335.	0.000749	25.08	1059.5	1084.5	1002.7	1027.7	0.0498	2.0508	2.1006	57
58	0.2385	0.4856	1291.	0.000775	26.08	1058.9	1085.0	1002.0	1028.1	0.0517	2.0458	2.0975	58
59	0.2472	0.5034	1249.	0.000801	27.08	1058.3	1085.4	1001.3	1028.4	0.0536	2.0408	2.0944	59
60°	0.2562	0.522	1208.	0.000828	28.08	1057.8	1085.9	1000.7	1028.7	0.0555	2.0358	2.0913	60°
61	0.2654	0.541	1168.	0.000856	29.08	1057.2	1086.3	1000.0	1029.1	0.0574	2.0308	2.0882	61
62	0.2749	0.560	1130.	0.000885	30.08	1056.7	1086.8	999.3	1029.4	0.0593	2.0258	2.0851	62
63	0.2847	0.580	1093.	0.000915	31.07	1056.1	1087.2	998.7	1029.8	0.0612	2.0209	2.0821	63
64	0.2949	0.601	1058.	0.000946	32.07	1055.6	1087.6	998.0	1030.1	0.0631	2.0160	2.0791	64
65°	0.3054	0.622	1024.	0.000977	33.07	1055.0	1088.1	997.4	1030.4	0.0650	2.0110	2.0760	65°
66	0.3161	0.644	991.	0.001009	34.07	1054.5	1088.5	996.7	1030 8	0.0669	2.0062	2.0731	66
67	0.3272	0.667	959.	0.001043	35.07	1053.9	1089.0	996.0	1031.1	0.0688	2.0013	2.0701	67
68	0.3386	0.690	928.	0.001077	36.07	1053.4	1089.4	995.4	1031.4	0.0707	1.9965	2.0672	68
69	0.3504	0.714	899.	0.001112	37.06	1052.8	1089.9	994.7	1031.8	0.0726	1.9916	2.0642	69
70°	0.3626	0.739	871.	0.001148	38.06	1052.3	1090.3	994.0	1032.1	0.0745	1.9868	2.0613	70°
71	0.3751	0.764	843.	0.001186	39.06	1051.7	1090.8	993.4	1032.4	0.0764	1.9821	2.0585	71
72	0.3880	0.790	817.	0.001224	40.05	1051.2	1091.2	992.7	1032.8	0.0783	1.9773	2.0556	72
73	0.4012	0.817	792.	0.001263	41.05	1050.6	1091.6	992.0	1033.1	0.0802	1.9726	2.0528	73
74	0.4148	0.845	767.	0.001304	42.05	1050.0	1092.1	991.4	1033.4	0.0821	1.9678	2.0499	74
75°	0.4288	0.873	743.	0.001346	43.05	1049.5	1092.5	990.7	1033.8	0.0840	1.9631	2.0471	75°
76	0.4432	0.903	720.	0.001389	44.04	1048.9	1093.0	990.1	1034.1	0.0858	1.9585	2.0443	76
77	0.4581	0.933	698.	0.001433	45.04	1048.4	1093.4	989.4	1034.4	0.0876	1.9538	2.0414	77
78	0.4735	0.964	677.	0.001477	46.04	1047.8	1093.9	988.7	1034.8	0.0895	1.9491	2.0386	78
79	0.4893	0.996	657.	0.001523	47.04	1047.3	1094.3	988.1	1035.1	0.0913	1.9445	2.0358	79

T° = t° + 459.6; J = 777.5 ft. lbs. per B.t.u. [log = 2.89 071]; A = 1/J = 1.286 × 10⁻³; 144 A = 0.1852 [log = $\bar{1}$.26 764].
For water, at 45° (0.15 lbs.), sp. vol., v′ or σ = 0.01602 cu. ft. per lb.; 1/v′ = 62.4 lbs. per cu. ft.; 144 Apv′ = 0.0004 B.t.u.;
at 70° (0.36 lbs.), v′ or σ = 0.01605 " ; 1/v′ = 62.3 " ; 144 Apv′ = 0.001 " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs. per sq. in.	Pressure inches of Hg.	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or φ	t
80°	0.505	1.029	636.8	0.001570	48.03	1046.7	1094.8	987.4	1035.4	0.0932	1.9398	2.0330	80°
81	0.522	1.063	617.5	0.001619	49.03	1046.2	1095.2	986.7	1035.8	0.0950	1.9352	2.0302	81
82	0.539	1.098	598.7	0.001670	50.03	1045.6	1095.6	986.1	1036.1	0.0969	1.9306	2.0275	82
83	0.557	1.134	580.5	0.001723	51.02	1045.1	1096.1	985.4	1036.4	0.0987	1.9260	2.0247	83
84	0.575	1.171	562.9	0.001777	52.02	1044.5	1096.5	984.8	1036.8	0.1005	1.9215	2.0220	84
85°	0.594	1.209	545.9	0.001832	53.02	1044.0	1097.0	984.1	1037.1	0.1023	1.9169	2.0192	85°
86	0.613	1.248	529.5	0.001889	54.01	1043.4	1097.4	983.4	1037.4	0.1041	1.9124	2.0165	86
87	0.633	1.289	513.7	0.001947	55.01	1042.8	1097.9	982.8	1037.8	0.1060	1.9079	2.0139	87
88	0.654	1.331	498.4	0.002007	56.01	1042.2	1098.3	982.1	1038.1	0.1078	1.9034	2.0112	88
89	0.675	1.373	483.6	0.002068	57.00	1041.7	1098.7	981.4	1038.4	0.1096	1.8989	2.0085	89
90°	0.696	1.417	469.3	0.002131	58.00	1041.2	1099.2	980.8	1038.8	0.1114	1.8944	2.0058	90°
91	0.718	1.462	455.5	0.002195	59.00	1040.6	1099.6	980.1	1039.1	0.1133	1.8900	2.0033	91
92	0.741	1.508	442.2	0.002261	60.00	1040.0	1100.1	979.4	1039.4	0.1151	1.8856	2.0007	92
93	0.765	1.556	429.4	0.002329	60.99	1039.5	1100.5	978.8	1039.8	0.1169	1.8812	1.9981	93
94	0.789	1.605	417.0	0.002398	61.99	1039.0	1101.0	978.1	1040.1	0.1187	1.8767	1.9954	94
95°	0.813	1.655	405.0	0.002469	62.99	1038.4	1101.4	977.4	1040.4	0.1205	1.8723	1.9928	95°
96	0.838	1.706	393.4	0.002542	63.98	1037.8	1101.8	976.8	1040.8	0.1223	1.8680	1.9903	96
97	0.864	1.759	382.2	0.002617	64.98	1037.3	1102.3	976.1	1041.1	0.1241	1.8636	1.9877	97
98	0.891	1.813	371.4	0.002693	65.98	1036.7	1102.8	975.5	1041.4	0.1259	1.8592	1.9851	98
99	0.918	1.869	360.9	0.002771	66.97	1036.2	1103.2	974.8	1041.8	0.1277	1.8549	1.9826	99
100°	0.946	1.926	350.8	0.002851	67.97	1035.6	1103.6	974.1	1042.1	0.1295	1.8505	1.9800	100°
101	0.975	1.985	341.0	0.002933	68.97	1035.1	1104.0	973.5	1042.4	0.1313	1.8463	1.9776	101
102	1.005	2.045	331.5	0.003017	69.96	1034.5	1104.5	972.8	1042.8	0.1330	1.8420	1.9750	102
103	1.035	2.107	322.2	0.003104	70.96	1034.0	1104.9	972.1	1043.1	0.1347	1.8377	1.9724	103
104	1.066	2.171	313.3	0.003192	71.96	1033.4	1105.3	971.5	1043.4	0.1365	1.8335	1.9700	104
105°	1.098	2.236	304.7	0.003282	72.95	1032.8	1105.8	970.8	1043.8	0.1383	1.8292	1.9675	105°
106	1.131	2.303	296.4	0.003374	73.95	1032.3	1106.2	970.1	1044.1	0.1401	1.8250	1.9651	106
107	1.165	2.372	288.3	0.003469	74.95	1031.7	1106.7	969.5	1044.4	0.1418	1.8208	1.9626	107
108	1.199	2.443	280.5	0.003565	75.95	1031.2	1107.1	968.8	1044.8	0.1436	1.8166	1.9602	108
109	1.235	2.515	272.9	0.003664	76.94	1030.6	1107.5	968.2	1045.1	0.1454	1.8124	1.9578	109
110°	1.271	2.589	265.5	0.003766	77.94	1030.0	1108.0	967.5	1045.4	0.1471	1.8082	1.9553	110°
111	1.308	2.665	258.3	0.003871	78.94	1029.5	1108.4	966.8	1045.8	0.1489	1.8041	1.9530	111
112	1.346	2.740	251.4	0.003978	79.93	1028.9	1108.8	966.2	1046.1	0.1506	1.8000	1.9506	112
113	1.386	2.822	244.7	0.004087	80.93	1028.4	1109.3	965.5	1046.4	0.1524	1.7959	1.9483	113
114	1.426	2.904	238.2	0.004198	81.93	1027.8	1109.7	964.8	1046.8	0.1541	1.7917	1.9458	114
115°	1.467	2.987	231.9	0.004312	82.92	1027.2	1110.2	964.2	1047.1	0.1559	1.7876	1.9435	115°
116	1.509	3.073	225.8	0.004429	83.92	1026.7	1110.6	963.5	1047.4	0.1576	1.7836	1.9412	116
117	1.553	3.161	219.9	0.004548	84.92	1026.1	1111.0	962.8	1047.8	0.1594	1.7795	1.9389	117
118	1.597	3.252	214.1	0.004671	85.92	1025.5	1111.5	962.2	1048.1	0.1611	1.7755	1.9366	118
119	1.642	3.344	208.5	0.004796	86.91	1025.0	1111.9	961.5	1048.4	0.1628	1.7715	1.9343	119
120°	1.689	3.438	203.1	0.004924	87.91	1024.4	1112.3	960.8	1048.7	0.1645	1.7674	1.9319	120°
121	1.736	3.535	197.9	0.005054	88.91	1023.9	1112.8	960.2	1049.1	0.1662	1.7634	1.9296	121
122	1.785	3.635	192.8	0.005187	89.91	1023.3	1113.2	959.5	1049.4	0.1679	1.7594	1.9273	122
123	1.835	3.737	187.9	0.005323	90.90	1022.7	1113.6	958.8	1049.7	0.1696	1.7555	1.9251	123
124	1.886	3.841	183.1	0.005462	91.90	1022.2	1114.1	958.2	1050.0	0.1713	1.7515	1.9228	124
125°	1.938	3.948	178.4	0.005605	92.90	1021.6	1114.5	957.5	1050.4	0.1730	1.7475	1.9205	125°
126	1.992	4.057	173.9	0.005751	93.90	1021.1	1115.0	956.8	1050.7	0.1747	1.7436	1.9183	126
127	2.047	4.168	169.6	0.005900	94.89	1020.5	1115.4	956.1	1051.0	0.1764	1.7397	1.9161	127
128	2.103	4.282	165.3	0.006052	95.89	1019.9	1115.8	955.5	1051.3	0.1781	1.7358	1.9139	128
129	2.160	4.399	161.1	0.006207	96.89	1019.4	1116.2	954.8	1051.7	0.1799	1.7318	1.9117	129

$T°=t°+459.6$; $J=777.5$ ft. lbs. per B.t.u. [log=2.89 071]; $A=1/J=1.286\times10^{-3}$; $144\,A=0.1852$ [log=$\bar{1}$.26 764].

For water, at 95° (0.81 lbs.), sp. vol., v' or $\sigma=0.0161$ cu. ft. per lb.; $1/v'=62.0$ lbs. per cu. ft.; $144\,Ap\sigma'=0.002$ B.t.u.;
at 120° (1.69 lbs.), " v' or $\sigma=0.0162$ " "; $1/v'=61.7$ " "; $144\,Ap\sigma'=0.005$ " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs. per sq. in.	Pressure inches of Hg.	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B.t.u. Evap.	Internal Energy B.t.u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or φ	t
130°	2.219	4.52	157.1	0.00637	97.89	1018.8	1116.7	954.1	1052.0	0.1816	1.7279	1.9095	130°
131	2.279	4.64	153.2	0.00653	98.89	1018.2	1117.1	953.4	1052.3	0.1833	1.7240	1.9073	131
132	2.340	4.76	149.4	0.00669	99.88	1017.7	1117.5	952.8	1052.7	0.1849	1.7202	1.9051	132
133	2.403	4.89	145.8	0.00686	100.88	1017.1	1118.0	952.1	1053.0	0.1866	1.7164	1.9030	133
134	2.467	5.02	142.2	0.00703	101.88	1016.5	1118.4	951.4	1053.3	0.1883	1.7125	1.9008	134
135°	2.533	5.16	138.7	0.00721	102.88	1016.0	1118.8	950.8	1053.6	0.1900	1.7086	1.8986	135°
136	2.600	5.29	135.4	0.00739	103.88	1015.4	1119.3	950.1	1054.0	0.1917	1.7048	1.8965	136
137	2.669	5.43	132.1	0.00757	104.87	1014.8	1119.7	949.4	1054.3	0.1933	1.7010	1.8943	137
138	2.740	5.58	128.9	0.00776	105.87	1014.3	1120.1	948.8	1054.6	0.1950	1.6972	1.8922	138
139	2.812	5.73	125.8	0.00795	106.87	1013.7	1120.6	948.1	1055.0	0.1967	1.6934	1.8901	139
140°	2.885	5.88	122.8	0.00814	107.87	1013.1	1121.0	947.4	1055.3	0.1984	1.6896	1.8880	140°
141	2.960	6.03	119.9	0.00834	108.87	1012.6	1121.4	946.8	1055.6	0.2000	1.6859	1.8859	141
142	3.037	6.18	117.1	0.00854	109.87	1012.0	1121.8	946.1	1055.9	0.2017	1.6821	1.8838	142
143	3.115	6.34	114.3	0.00875	110.87	1011.4	1122.3	945.4	1056.3	0.2033	1.6774	1.8817	143
144	3.195	6.51	111.6	0.00896	111.87	1010.8	1122.7	944.7	1056.6	0.2050	1.6746	1.8796	144
145°	3.277	6.67	109.0	0.00918	112.86	1010.3	1123.1	944.0	1056.9	0.2067	1.6709	1.8776	145°
146	3.361	6.84	106.5	0.00940	113.86	1009.7	1123.6	943.4	1057.2	0.2083	1.6672	1.8755	146
147	3.446	7.02	104.0	0.00962	114.86	1009.1	1124.0	942.7	1057.6	0.2100	1.6635	1.8735	147
148	3.533	7.20	101.6	0.00985	115.86	1008.6	1124.4	942.0	1057.9	0.2116	1.6598	1.8714	148
149	3.623	7.38	99.2	0.01008	116.86	1008.0	1124.8	941.4	1058.2	0.2132	1.6562	1.8694	149
150°	3.714	7.57	96.9	0.01032	117.86	1007.4	1125.3	940.7	1058.5	0.2149	1.6525	1.8674	150°
151	3.809	7.76	94.7	0.01056	118.86	1006.8	1125.7	940.0	1058.8	0.2165	1.6488	1.8653	151
152	3.902	7.95	92.6	0.01080	119.86	1006.2	1126.1	939.3	1059.2	0.2182	1.6452	1.8634	152
153	3.999	8.14	90.5	0.01105	120.86	1005.7	1126.5	938.6	1059.5	0.2198	1.6416	1.8614	153
154	4.098	8.34	88.4	0.01131	121.86	1005.1	1127.0	938.0	1059.8	0.2214	1.6380	1.8594	154
155°	4.199	8.55	86.4	0.01157	122.86	1004.5	1127.4	937.3	1060.2	0.2231	1.6344	1.8575	155°
156	4.303	8.76	84.5	0.01184	123.86	1003.9	1127.8	936.6	1060.5	0.2247	1.6308	1.8555	156
157	4.408	8.98	82.6	0.01211	124.86	1003.4	1128.2	935.9	1060.8	0.2263	1.6272	1.8535	157
158	4.515	9.20	80.7	0.01239	125.86	1002.8	1128.6	935.3	1061.1	0.2279	1.6236	1.8515	158
159	4.625	9.42	78.9	0.01267	126.86	1002.2	1129.1	934.6	1061.5	0.2295	1.6201	1.8496	159
160°	4.737	9.65	77.2	0.01296	127.86	1001.6	1129.5	933.9	1061.8	0.2311	1.6165	1.8476	160°
161	4.851	9.88	75.5	0.01325	128.86	1001.1	1129.9	933.3	1062.1	0.2327	1.6130	1.8457	161
162	4.967	10.12	73.8	0.01355	129.86	1000.5	1130.4	932.6	1062.4	0.2344	1.6094	1.8438	162
163	5.086	10.36	72.2	0.01386	130.86	999.9	1130.8	931.9	1062.8	0.2360	1.6059	1.8419	163
164	5.208	10.61	70.6	0.01417	131.86	999.3	1131.2	931.2	1063.1	0.2376	1.6024	1.8400	164
165°	5.333	10.86	69.1	0.01448	132.86	998.7	1131.6	930.5	1063.4	0.2391	1.5989	1.8380	165°
166	5.460	11.12	67.6	0.01480	133.86	998.2	1132.0	929.8	1063.7	0.2407	1.5954	1.8361	166
167	5.589	11.38	66.1	0.01513	134.86	997.6	1132.4	929.1	1064.0	0.2423	1.5919	1.8342	167
168	5.721	11.65	64.7	0.01546	135.86	997.0	1132.8	928.4	1064.3	0.2439	1.5885	1.8324	168
169	5.855	11.92	63.3	0.01580	136.86	996.4	1133.3	927.8	1064.6	0.2455	1.5850	1.8305	169
170°	5.992	12.20	62.0	0.01614	137.87	995.8	1133.7	927.1	1064.9	0.2470	1.5816	1.8286	170°
171	6.131	12.48	60.7	0.01649	138.87	995.2	1134.1	926.4	1065.2	0.2486	1.5782	1.8268	171
172	6.273	12.77	59.4	0.01685	139.87	994.6	1134.5	925.7	1065.6	0.2502	1.5747	1.8249	172
173	6.417	13.07	58.1	0.01721	140.87	994.0	1134.9	925.0	1065.9	0.2518	1.5713	1.8231	173
174	6.564	13.37	56.9	0.01758	141.87	993.5	1135.3	924.3	1066.2	0.2534	1.5679	1.8213	174
175°	6.714	13.67	55.7	0.01796	142.87	992.9	1135.7	923.6	1066.5	0.2550	1.5645	1.8195	175°
176	6.867	13.98	54.5	0.01834	143.87	992.3	1136.2	923.0	1066.8	0.2565	1.5611	1.8176	176
177	7.023	14.30	53.4	0.01873	144.88	991.7	1136.6	922.3	1067.1	0.2581	1.5577	1.8158	177
178	7.182	14.62	52.3	0.01912	145.88	991.1	1137.0	921.6	1067.5	0.2597	1.5543	1.8140	178
179	7.344	14.95	51.2	0.01953	146.88	990.5	1137.4	920.9	1067.8	0.2612	1.5510	1.8122	179

$T° = t° + 459.6$; $J = 777.5$ ft. lbs. per B.t.u. [log = 2.89 071]; $A = 1/J = 1.286 \times 10^{-3}$; $144\,A = 0.1852$ [log = $\bar{1}$.26 764].

For water, at 145° (3.28 lbs.), sp. vol., v′ or σ = 0.0163 cu. ft. per lb.; 1/v′ = 61.3 lbs. per cu. ft.; 144 Apv′ = 0.01 B.t.u.;
at 170° (5.99 lbs.), v′ or σ = 0.0164 " ; 1/v′ = 60.8 " " ; 144 Apv′ = 0.02 " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs. per sq. in.	Pressure inches of Hg.	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or ø	L/T or r/T	N or ϕ	t
180°	7.51	15.29	50.15	0.01994	147.88	989.9	1137.8	920.2	1068.1	0.2628	1.5476	1.8104	180°
181	7.68	15.63	49.12	0.02036	148.88	989.3	1138.2	919.5	1068.4	0.2644	1.5443	1.8087	181
182	7.85	15.98	48.12	0.02078	149.89	988.7	1138.6	918.8	1068.7	0.2659	1.5409	1.8068	182
183	8.02	16.34	47.14	0.02121	150.89	988.1	1139.0	918.1	1069.0	0.2675	1.5376	1.8051	183
184	8.20	16.70	46.18	0.02165	151.89	987.5	1139.4	917.4	1069.3	0.2690	1.5343	1.8033	184
185°	8.38	17.07	45.25	0.02210	152.89	986.9	1139.8	916.7	1069.6	0.2706	1.5310	1.8016	185°
186	8.57	17.45	44.34	0.02255	153.89	986.3	1140.2	916.0	1069.9	0.2721	1.5277	1.7998	186
187	8.76	17.83	43.45	0.02301	154.90	985.7	1140.6	915.3	1070.2	0.2737	1.5244	1.7981	187
188	8.95	18.22	42.59	0.02348	155.90	985.1	1141.0	914.6	1070.5	0.2752	1.5211	1.7963	188
189	9.14	18.61	41.74	0.02396	156.90	984.5	1141.4	913.9	1070.8	0.2767	1.5179	1.7946	189
190°	9.34	19.02	40.91	0.02444	157.91	983.9	1141.8	913.2	1071.1	0.2783	1.5146	1.7929	190°
191	9.54	19.43	40.10	0.02493	158.91	983.3	1142.2	912.5	1071.4	0.2798	1.5113	1.7911	191
192	9.74	19.85	39.31	0.02544	159.91	982.7	1142.6	911.8	1071.7	0.2813	1.5081	1.7894	192
193	9.95	20.27	38.54	0.02595	160.91	982.1	1143.0	911.1	1072.0	0.2829	1.5048	1.7877	193
194	10.17	20.71	37.78	0.02647	161.92	981.5	1143.4	910.4	1072.3	0.2845	1.5016	1.7861	194
195°	10.39	21.15	37.04	0.02700	162.92	980.9	1143.8	909.7	1072.6	0.2860	1.4984	1.7844	195°
196	10.61	21.60	36.32	0.02753	163.92	980.3	1144.2	909.0	1072.9	0.2876	1.4952	1.7828	196
197	10.83	22.05	35.62	0.02807	164.93	979.7	1144.6	908.3	1073.2	0.2891	1.4920	1.7811	197
198	11.06	22.52	34.93	0.02863	165.93	979.1	1145.0	907.6	1073.5	0.2906	1.4888	1.7794	198
199	11.29	22.99	34.26	0.02919	166.94	978.4	1145.4	906.9	1073.8	0.2921	1.4856	1.7777	199
200°	11.52	23.47	33.60	0.02976	167.94	977.8	1145.8	906.2	1074.1	0.2937	1.4824	1.7761	200°
201	11.76	23.95	32.96	0.03034	168.94	977.2	1146.2	905.5	1074.4	0.2952	1.4792	1.7744	201
202	12.01	24.45	32.33	0.03093	169.95	976.6	1146.6	904.8	1074.7	0.2967	1.4760	1.7727	202
203	12.26	24.96	31.72	0.03153	170.95	976.0	1146.9	904.0	1075.0	0.2982	1.4729	1.7711	203
204	12.51	25.48	31.12	0.03214	171.96	975.4	1147.3	903.3	1075.3	0.2997	1.4697	1.7694	204
205°	12.77	26.00	30.53	0.03276	172.96	974.7	1147.7	902.6	1075.6	0.3012	1.4666	1.7678	205°
206	13.03	26.53	29.95	0.03339	173.97	974.1	1148.1	901.9	1075.9	0.3027	1.4635	1.7662	206
207	13.30	27.08	29.39	0.03402	174.97	973.5	1148.5	901.2	1076.1	0.3042	1.4603	1.7645	207
208	13.57	27.63	28.85	0.03466	175.98	972.9	1148.9	900.4	1076.4	0.3057	1.4572	1.7629	208
209	13.85	28.19	28.32	0.03531	176.98	972.2	1149.2	899.7	1076.7	0.3072	1.4541	1.7613	209
210°	14.13	28.76	27.80	0.03597	177.99	971.6	1149.6	899.0	1076.9	0.3087	1.4510	1.7597	210°
211	14.41	29.33	27.29	0.03664	178.99	971.0	1150.0	898.3	1077.2	0.3103	1.4478	1.7581	211
212	14.70	29.92	26.79	0.03732	180.00	970.4	1150.4	897.6	1077.5	0.3118	1.4447	1.7565	212
213	14.99	1.020*	26.30	0.03802	181.0	969.7	1150.7	896.8	1077.8	0.3133	1.4416	1.7549	213
214	15.29	1.041	25.82	0.03873	182.0	969.1	1151.1	896.1	1078.1	0.3148	1.4385	1.7533	214
215°	15.60	1.062*	25.35	0.03945	183.0	968.4	1151.5	895.4	1078.3	0.3163	1.4354	1.7517	215°
216	15.91	1.083	24.89	0.04018	184.0	967.8	1151.8	894.6	1078.6	0.3178	1.4323	1.7501	216
217	16.22	1.104	24.44	0.04092	185.0	967.2	1152.2	893.9	1078.9	0.3193	1.4292	1.7485	217
218	16.54	1.125	24.00	0.04167	186.1	966.5	1152.6	893.2	1079.2	0.3208	1.4261	1.7469	218
219	16.86	1.147	23.57	0.04243	187.1	965.9	1152.9	892.4	1079.4	0.3223	1.4230	1.7453	219
220°	17.19	1.170*	23.15	0.04320	188.1	965.2	1153.3	891.7	1079.7	0.3238	1.4199	1.7437	220°
221	17.53	1.193	22.74	0.04398	189.1	964.6	1153.7	891.0	1080.0	0.3252	1.4169	1.7421	221
222	17.87	1.216	22.34	0.04477	190.1	963.9	1154.0	890.2	1080.2	0.3267	1.4139	1.7406	222
223	18.21	1.239	21.94	0.04558	191.1	963.3	1154.4	889.5	1080.5	0.3282	1.4110	1.7392	223
224	18.56	1.263	21.55	0.04640	192.1	962.6	1154.8	888.7	1080.8	0.3297	1.4081	1.7378	224
225°	18.91	1.287*	21.17	0.04723	193.1	962.0	1155.1	887.9	1081.1	0.3312	1.4052	1.7364	225°
226	19.27	1.311	20.80	0.04807	194.1	961.3	1155.5	887.2	1081.3	0.3326	1.4023	1.7349	226
227	19.64	1.336	20.44	0.04892	195.2	960.7	1155.8	886.5	1081.6	0.3341	1.3993	1.7334	227
228	20.01	1.362	20.08	0.04979	196.2	960.0	1156.2	885.8	1081.9	0.3355	1.3964	1.7319	228
229	20.39	1.387	19.73	0.05067	197.2	959.4	1156.5	885.0	1082.1	0.3370	1.3934	1.7304	229

* In standard atmospheres. 1 atmo = 760 mms. of Hg. by definition = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.
For water, at 195° (10.4 lbs.), sp. vol., v′ or σ = 0.0166 cu. ft. per lb.; 1/v′ = 60.3 lbs. per cu. ft.; 144 Apv′ = 0.03 B.t.u.;
at 220° (17.2 lbs.), " v′ or σ = 0.0168 " " 1/v′ = 59.6 " " 144 Apv′ = 0.05 " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs.	Pressure Atmos*	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or ϕ	t
230°	20.77	1.413	19.39	0.0516	198.2	958.7	1156.9	884.3	1082.4	0.3384	1.3905	1.7289	230°
231	21.16	1.440	19.05	0.0525	199.2	958.1	1157.2	883.6	1082.7	0.3399	1.3875	1.7274	231
232	21.56	1.467	18.72	0.0534	200.2	957.4	1157.6	882.8	1083.0	0.3414	1.3844	1.7258	232
233	21.96	1.494	18.40	0.0543	201.2	956.7	1158.0	882.1	1083.2	0.3429	1.3814	1.7243	233
234	22.37	1.522	18.09	0.0553	202.2	956.1	1158.3	881.3	1083.5	0.3443	1.3784	1.7227	234
235°	22.79	1.550	17.78	0.0562	203.2	955.4	1158.7	880.6	1083.8	0.3458	1.3754	1.7212	235°
236	23.21	1.579	17.47	0.0572	204.2	954.8	1159.0	879.8	1084.0	0.3472	1.3725	1.7197	236
237	23.64	1.609	17.17	0.0582	205.3	954.1	1159.4	879.1	1084.3	0.3487	1.3695	1.7182	237
238	24.08	1.638	16.88	0.0592	206.3	953.4	1159.7	878.3	1084.5	0.3501	1.3666	1.7167	238
239	24.52	1.668	16.60	0.0602	207.3	952.8	1160.0	877.6	1084.8	0.3516	1.3636	1.7152	239
240°	24.97	1.699	16.32	0.0613	208.3	952.1	1160.4	876.8	1085.0	0.3531	1.3607	1.7138	240°
241	25.42	1.730	16.05	0.0623	209.3	951.4	1160.7	876.1	1085.3	0.3546	1.3578	1.7124	241
242	25.88	1.761	15.78	0.0634	210.3	950.7	1161.1	875.3	1085.6	0.3560	1.3550	1.7110	242
243	26.35	1.793	15.52	0.0644	211.4	950.1	1161.4	874.6	1085.8	0.3575	1.3521	1.7096	243
244	26.83	1.826	15.26	0.0655	212.4	949.4	1161.8	873.8	1086.1	0.3589	1.3493	1.7082	244
245°	27.31	1.859	15.01	0.0666	213.4	948.7	1162.1	873.1	1086.4	0.3603	1.3465	1.7068	245°
246	27.80	1.892	14.76	0.0678	214.4	948.0	1162.4	872.3	1086.6	0.3617	1.3437	1.7054	246
247	28.30	1.926	14.52	0.0689	215.4	947.4	1162.8	871.6	1086.9	0.3631	1.3408	1.7039	247
248	28.80	1.960	14.28	0.0700	216.4	946.7	1163.1	870.8	1087.1	0.3646	1.3379	1.7025	248
249	29.31	1.994	14.05	0.0712	217.4	946.0	1163.4	870.0	1087.4	0.3661	1.3350	1.7011	249
250°	29.82	2.029	13.82	0.0724	218.5	945.3	1163.8	869.2	1087.6	0.3675	1.3321	1.6996	250°
251	30.34	2.065	13.59	0.0736	219.5	944.6	1164.1	868.5	1087.9	0.3689	1.3292	1.6981	251
252	30.88	2.101	13.37	0.0748	220.5	943.9	1164.4	867.7	1088.1	0.3704	1.3263	1.6967	252
253	31.42	2.138	13.16	0.0760	221.5	943.3	1164.8	867.0	1088.4	0.3718	1.3235	1.6953	253
254	31.97	2.175	12.95	0.0772	222.5	942.6	1165.1	866.2	1088.6	0.3732	1.3207	1.6939	254
255°	32.53	2.213	12.74	0.0785	223.5	941.9	1165.4	865.4	1088.9	0.3747	1.3179	1.6926	255°
256	33.09	2.251	12.54	0.0797	224.6	941.2	1165.8	864.6	1089.1	0.3761	1.3151	1.6912	256
257	33.66	2.290	12.34	0.0810	225.6	940.5	1166.1	863.9	1089.4	0.3776	1.3122	1.6898	257
258	34.24	2.330	12.14	0.0824	226.6	939.8	1166.4	863.1	1089.6	0.3790	1.3094	1.6884	258
259	34.83	2.370	11.95	0.0837	227.6	939.1	1166.7	862.3	1089.8	0.3804	1.3067	1.6871	259
260°	35.42	2.410	11.76	0.0850	228.6	938.4	1167.0	861.5	1090.1	0.3818	1.3040	1.6858	260°
261	36.02	2.451	11.57	0.0864	229.6	937.7	1167.4	860.8	1090.3	0.3833	1.3012	1.6845	261
262	36.64	2.493	11.39	0.0878	230.7	937.0	1167.7	860.0	1090.5	0.3847	1.2985	1.6832	262
263	37.26	2.535	11.22	0.0892	231.7	936.3	1168.0	859.2	1090.8	0.3861	1.2957	1.6818	263
264	37.89	2.578	11.04	0.0906	232.7	935.6	1168.3	858.4	1091.0	0.3874	1.2930	1.6804	264
265°	38.52	2.621	10.87	0.0920	233.7	934.9	1168.6	857.6	1091.2	0.3888	1.2903	1.6791	265°
266	39.16	2.665	10.70	0.0935	234.7	934.2	1168.9	856.9	1091.5	0.3902	1.2876	1.6778	266
267	39.82	2.710	10.54	0.0949	235.8	933.5	1169.3	856.1	1091.7	0.3916	1.2849	1.6765	267
268	40.48	2.755	10.38	0.0963	236.8	932.8	1169.6	855.3	1092.0	0.3930	1.2821	1.6751	268
269	41.16	2.801	10.22	0.0978	237.8	932.1	1169.9	854.5	1092.2	0.3944	1.2794	1.6738	269
270°	41.85	2.847	10.06	0.0994	238.8	931.4	1170.2	853.8	1092.4	0.3959	1.2766	1.6725	270°
271	42.54	2.894	9.91	0.1010	239.9	930.7	1170.5	853.0	1092.7	0.3973	1.2738	1.6711	271
272	43.24	2.942	9.76	0.1025	240.9	930.0	1170.8	852.2	1092.9	0.3987	1.2711	1.6698	272
273	43.95	2.990	9.61	0.1041	241.9	929.3	1171.2	851.4	1093.2	0.4001	1.2683	1.6684	273
274	44.67	3.039	9.46	0.1057	242.9	928.6	1171.5	850.6	1093.4	0.4015	1.2656	1.6671	274
275°	45.40	3.089	9.32	0.1073	243.9	927.9	1171.8	849.8	1093.6	0.4029	1.2629	1.6658	275°
276	46.14	3.140	9.18	0.1090	245.0	927.1	1172.1	849.1	1093.9	0.4043	1.2602	1.6645	276
277	46.89	3.191	9.04	0.1106	246.0	926.4	1172.4	848.3	1094.1	0.4057	1.2575	1.6632	277
278	47.64	3.242	8.91	0.1123	247.0	925.7	1172.7	847.5	1094.3	0.4070	1.2549	1.6619	278
279	48.40	3.294	8.77	0.1140	248.0	925.0	1173.0	846.7	1094.5	0.4084	1.2523	1.6607	279

* 1 atmo (standard atmosphere) = 760 mms. of Hg. by definition = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.

For water, at 245° (27.3 lbs.), sp. vol., v′ or σ = 0.0170 cu. ft. per lb.; 1/v′ = 59.0 lbs. per cu. ft.; 144 Apv′ = 0.09 B.t.u.;
at 270° (41.8 lbs.), v′ or σ = 0.0172 " ; 1/v′ = 58.3 " ; 144 Apv′ = 0.13 " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs.	Pressure Atmos	Sp.Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or φ	t
280°	49.18	3.347	8.64	0.1157	249.0	924.3	1173.3	845.9	1094.8	0.4098	1.2496	1.6594	280°
281	49.97	3.401	8.51	0.1174	250.1	923.5	1173.6	845.1	1095.0	0.4112	1.2470	1.6582	281
282	50.77	3.455	8.38	0.1192	251.1	922.8	1173.9	844.3	1095.2	0.4126	1.2443	1.6569	282
283	51.58	3.510	8.26	0.1210	252.1	922.1	1174.2	843.5	1095.4	0.4140	1.2416	1.6556	283
284	52.40	3.566	8.14	0.1228	253.1	921.3	1174.4	842.7	1095.6	0.4154	1.2389	1.6543	284
285°	53.24	3.623	8.02	0.1246	254.2	920.5	1174.7	841.9	1095.9	0.4168	1.2363	1.6531	285°
286	54.08	3.680	7.90	0.1264	255.2	919.8	1175.0	841.1	1096.1	0.4181	1.2337	1.6518	286
287	54.93	3.738	7.79	0.1283	256.2	919.1	1175.3	840.3	1096.3	0.4195	1.2311	1.6506	287
288	55.79	3.797	7.68	0.1302	257.2	918.4	1175.6	839.5	1096.5	0.4209	1.2284	1.6493	288
289	56.67	3.856	7.57	0.1322	258.3	917.6	1175.9	838.6	1096.7	0.4222	1.2258	1.6480	289
290°	57.55	3.916	7.46	0.1341	259.3	916.9	1176.2	837.8	1097.0	0.4235	1.2232	1.6467	290°
291	58.44	3.977	7.35	0.1360	260.3	916.2	1176.5	837.0	1097.2	0.4249	1.2205	1.6454	291
292	59.34	4.038	7.24	0.1380	261.3	915.4	1176.8	836.2	1097.4	0.4262	1.2179	1.6441	292
293	60.26	4.100	7.14	0.1400	262.4	914.7	1177.1	835.4	1097.6	0.4276	1.2153	1.6429	293
294	61.19	4.163	7.04	0.1421	263.4	914.0	1177.4	834.6	1097.8	0.4290	1.2127	1.6417	294
295°	62.13	4.227	6.94	0.1441	264.4	913.2	1177.6	833.8	1098.0	0.4304	1.2101	1.6405	295°
296	63.08	4.292	6.84	0.1462	265.5	912.4	1177.9	833.0	1098.2	0.4317	1.2075	1.6392	296
297	64.04	4.358	6.74	0.1483	266.5	911.7	1178.2	832.2	1098.4	0.4331	1.2049	1.6380	297
298	65.01	4.424	6.65	0.1504	267.5	911.0	1178.5	831.4	1098.7	0.4344	1.2023	1.6367	298
299	66.00	4.491	6.56	0.1525	268.5	910.3	1178.8	830.5	1098.9	0.4358	1.1997	1.6355	299
300°	67.00	4.559	6.46	0.1547	269.6	909.5	1179.1	829.7	1099.1	0.4371	1.1972	1.6343	300°
301	68.01	4.628	6.37	0.1569	270.6	908.7	1179.3	828.9	1099.3	0.4385	1.1946	1.6331	301
302	69.03	4.697	6.28	0.1591	271.6	908.0	1179.6	828.1	1099.5	0.4398	1.1921	1.6319	302
303	70.06	4.767	6.20	0.1613	272.7	907.2	1179.9	827.3	1099.7	0.4412	1.1895	1.6307	303
304	71.11	4.838	6.21	0.1636	273.7	906.4	1180.1	826.4	1099.9	0.4426	1.1869	1.6295	304
305°	72.17	4.911	6.03	0.1659	274.7	905.7	1180.4	825.6	1100.1	0.4439	1.1844	1.6283	305°
306	73.25	4.984	5.94	0.1683	275.8	904.9	1180.7	824.8	1100.3	0.4452	1.1819	1.6271	306
307	74.34	5.058	5.86	0.1707	276.8	904.2	1181.0	824.0	1100.5	0.4466	1.1793	1.6259	307
308	75.44	5.133	5.78	0.1731	277.8	903.4	1181.2	823.2	1100.7	0.4480	1.1767	1.6247	308
309	76.55	5.209	5.70	0.1755	278.8	902.6	1181.5	822.3	1100.9	0.4494	1.1742	1.6236	309
310°	77.67	5.285	5.62	0.1779	279.9	901.9	1181.8	821.5	1101.1	0.4507	1.1717	1.6224	310°
311	78.81	5.362	5.55	0.1804	280.9	901.1	1182.0	820.7	1101.3	0.4520	1.1692	1.6212	311
312	79.97	5.441	5.47	0.1829	281.9	900.3	1182.3	819.9	1101.5	0.4533	1.1667	1.6200	312
313	81.13	5.520	5.40	0.1854	283.0	899.6	1182.6	819.0	1101.7	0.4547	1.1642	1.6189	313
314	82.30	5.600	5.33	0.1879	284.0	898.8	1182.8	818.2	1101.9	0.4560	1.1617	1.6177	314
315°	83.49	5.681	5.26	0.1904	285.0	898.0	1183.1	817.4	1102.1	0.4573	1.1592	1.6165	315°
316	84.69	5.763	5.19	0.1930	286.1	897.3	1183.3	816.5	1102.3	0.4587	1.1567	1.6154	316
317	85.90	5.845	5.12	0.1956	287.1	896.5	1183.6	815.7	1102.5	0.4600	1.1542	1.6142	317
318	87.13	5.928	5.05	0.1982	288.1	895.7	1183.8	814.9	1102.7	0.4613	1.1517	1.6130	318
319	88.37	6.013	4.98	0.2009	289.2	894.9	1184.1	814.0	1102.9	0.4627	1.1492	1.6119	319
320°	89.63	6.099	4.91	0.2036	290.2	894.2	1184.4	813.2	1103.1	0.4640	1.1468	1.6108	320°
321	90.90	6.185	4.85	0.2064	291.2	893.4	1184.6	812.4	1103.3	0.4653	1.1444	1.6097	321
322	92.19	6.273	4.78	0.2092	292.3	892.6	1184.9	811.5	1103.5	0.4666	1.1419	1.6085	322
323	93.50	6.362	4.72	0.2120	293.3	891.8	1185.1	810.7	1103.7	0.4679	1.1394	1.6073	323
324	94.82	6.452	4.66	0.2148	294.3	891.0	1185.4	809.8	1103.9	0.4692	1.1370	1.6062	324
325°	96.15	6.543	4.60	0.2176	295.4	890.2	1185.6	809.0	1104.1	0.4705	1.1346	1.6051	325°
326	97.49	6.634	4.54	0.2205	296.4	889.5	1185.9	808.2	1104.3	0.4719	1.1321	1.6040	326
327	98.85	6.726	4.48	0.2234	297.5	888.7	1186.1	807.3	1104.5	0.4732	1.1297	1.6029	327
328	100.23	6.820	4.42	0.2263	298.5	887.9	1186.4	806.5	1104.7	0.4745	1.1273	1.6018	328
329	101.63	6.916	4.36	0.2293	299.6	887.1	1186.6	805.6	1104.8	0.4758	1.1249	1.6007	329

$T°=t°+459.6$; $J=777.5$ ft. lbs. per B.t.u. [log=2.89 071]; $A=1/J=1.286\times10^{-3}$; $144\,A=0.1852$ [log $\bar{1}$.26 764].

For water, at 295° (62.1 lbs.), sp. vol., v′ or $\sigma=0.0174$ cu. ft. per lb.; $1/v'=57.5$ lbs. per cu. ft.; $144\,Apv'=0.20$ B.t.u.;
at 320° (89.6 lbs.) v′ or $\sigma=0.0176$ " ; $1/v'=56.7$ " ; $144\,Apv'=0.30$ " .

Table 1: Temperatures

Temp. Fahr. t	Pressure lbs. p	Atmos* —	Sp. Vol. cu. ft. per lb. v or s	Density lbs. per cu. ft. 1/v	Heat of the liquid h or q	Latent heat of evap. L or r	Total heat of steam H	Internal Energy B. t. u. Evap. I or ρ	Steam E	Entropy Water n or σ	Evap. L/T or r/T	Steam N or φ	Temp. Fahr. t
330°	103.0	7.01	4.306	0.2322	300.6	886.3	1186.9	804.8	1105.0	0.4771	1.1225	1.5996	330°
331	104.4	7.11	4.250	0.2353	301.6	885.5	1187.1	803.9	1105.2	0.4784	1.1200	1.5984	331
332	105.9	7.21	4.195	0.2384	302.7	884.7	1187.4	803.1	1105.4	0.4797	1.1176	1.5973	332
333	107.4	7.31	4.141	0.2415	303.7	883.9	1187.6	802.2	1105.6	0.4810	1.1152	1.5962	333
334	108.8	7.40	4.088	0.2446	304.7	883.1	1187.8	801.4	1105.8	0.4824	1.1127	1.5951	334
335°	110.3	7.50	4.035	0.2478	305.8	882.3	1188.1	800.5	1106.0	0.4837	1.1103	1.5940	335°
336	111.8	7.61	3.984	0.2510	306.8	881.5	1188.3	799.7	1106.1	0.4850	1.1079	1.5929	336
337	113.4	7.72	3.934	0.2542	307.9	880.7	1188.6	798.8	1106.3	0.4863	1.1055	1.5918	337
338	114.9	7.82	3.884	0.2575	308.9	879.9	1188.8	798.0	1106.5	0.4876	1.1032	1.5908	338
339	116.4	7.92	3.835	0.2608	309.9	879.1	1189.0	797.2	1106.7	0.4889	1.1008	1.5897	339
340°	118.0	8.03	3.787	0.2641	311.0	878.3	1189.3	796.3	1106.9	0.4902	1.0984	1.5886	340°
341	119.6	8.14	3.739	0.2675	312.0	877.5	1189.5	795.4	1107.0	0.4915	1.0961	1.5876	341
342	121.2	8.25	3.692	0.2709	313.0	876.7	1189.7	794.6	1107.2	0.4928	1.0937	1.5865	342
343	122.8	8.36	3.646	0.2743	314.1	875.9	1190.0	793.7	1107.4	0.4941	1.0913	1.5854	343
344	124.4	8.47	3.600	0.2778	315.1	875.1	1190.2	792.9	1107.6	0.4954	1.0889	1.5843	344
345°	126.0	8.58	3.555	0.2813	316.2	874.2	1190.4	792.0	1107.8	0.4967	1.0875	1.5832	345°
346	127.7	8.69	3.511	0.2848	317.2	873.4	1190.6	791.2	1108.0	0.4980	1.0841	1.5821	346
347	129.4	8.80	3.468	0.2884	318.3	872.6	1190.9	790.3	1108.1	0.4993	1.0818	1.5811	347
348	131.1	8.92	3.425	0.2920	319.3	871.8	1191.1	789.4	1108.3	0.5006	1.0794	1.5800	348
349	132.8	9.04	3.383	0.2956	320.3	871.0	1191.3	788.6	1108.5	0.5019	1.0771	1.5790	349
350°	134.6	9.16	3.342	0.2992	321.4	870.1	1191.5	787.7	1108.6	0.5032	1.0748	1.5780	350°
351	136.3	9.28	3.301	0.3029	322.4	869.3	1191.8	786.8	1108.8	0.5045	1.0724	1.5769	351
352	138.1	9.40	3.261	0.3067	323.5	868.5	1192.0	786.0	1109.0	0.5058	1.0700	1.5758	352
353	139.9	9.52	3.221	0.3105	324.5	867.7	1192.2	785.1	1109.2	0.5071	1.0677	1.5748	353
354	141.7	9.64	3.182	0.3143	325.6	866.8	1192.4	784.2	1109.3	0.5084	1.0653	1.5737	354
355°	143.5	9.76	3.143	0.3182	326.6	866.0	1192.6	783.4	1109.5	0.5097	1.0630	1.5727	355°
356	145.4	9.89	3.105	0.3221	327.7	865.2	1192.9	782.5	1109.7	0.5110	1.0607	1.5717	356
357	147.2	10.02	3.067	0.3261	328.7	864.4	1193.1	781.6	1109.8	0.5123	1.0584	1.5707	357
358	149.1	10.15	3.030	0.3301	329.8	863.5	1193.3	780.8	1110.0	0.5136	1.0560	1.5696	358
359	151.0	10.28	2.993	0.3341	330.8	862.7	1193.5	779.9	1110.2	0.5149	1.0537	1.5686	359
360°	153.0	10.41	2.957	0.3382	331.9	861.8	1193.7	779.0	1110.4	0.5162	1.0514	1.5676	360°
361	154.9	10.54	2.922	0.3423	332.9	861.0	1193.9	778.1	1110.5	0.5174	1.0491	1.5665	361
362	156.9	10.68	2.887	0.3464	334.0	860.2	1194.1	777.2	1110.7	0.5187	1.0468	1.5655	362
363	158.8	10.81	2.853	0.3505	335.0	859.4	1194.4	776.4	1110.8	0.5200	1.0445	1.5645	363
364	160.8	10.94	2.820	0.3546	336.1	858.5	1194.6	775.5	1111.0	0.5213	1.0422	1.5635	364
365°	162.9	11.08	2.787	0.3588	337.1	857.7	1194.8	774.6	1111.1	0.5225	1.0400	1.5625	365°
366	164.9	11.22	2.754	0.3631	338.2	856.8	1195.0	773.7	1111.3	0.5238	1.0377	1.5615	366
367	167.0	11.36	2.722	0.3674	339.2	856.0	1195.2	772.8	1111.4	0.5251	1.0354	1.5605	367
368	169.0	11.50	2.690	0.3717	340.3	855.1	1195.4	771.9	1111.6	0.5263	1.0332	1.5595	368
369	171.1	11.64	2.658	0.3761	341.3	854.2	1195.6	771.0	1111.8	0.5276	1.0309	1.5585	369
370°	173.3	11.79	2.627	0.3806	342.4	853.4	1195.8	770.2	1111.9	0.5289	1.0286	1.5576	370°
371	175.4	11.93	2.597	0.3851	343.4	852.6	1196.0	769.3	1112.1	0.5301	1.0263	1.5564	371
372	177.6	12.08	2.567	0.3896	344.5	851.7	1196.2	768.4	1112.2	0.5314	1.0240	1.5554	372
373	179.7	12.23	2.537	0.3942	345.5	850.8	1196.4	767.5	1112.4	0.5327	1.0217	1.5544	373
374	181.9	12.38	2.508	0.3998	346.6	850.0	1196.6	766.6	1112.6	0.5340	1.0194	1.5534	374
375°	184.2	12.53	2.479	0.4034	347.6	849.1	1196.8	765.7	1112.7	0.5352	1.0172	1.5524	375°
376	186.4	12.68	2.450	0.4081	348.7	848.3	1197.0	764.8	1112.9	0.5364	1.0150	1.5514	376
377	188.7	12.84	2.422	0.4129	349.8	847.4	1197.2	763.9	1113.0	0.5376	1.0128	1.5504	377
378	190.9	12.99	2.394	0.4177	350.8	846.5	1197.4	763.0	1113.2	0.5389	1.0105	1.5494	378
379	193.2	13.15	2.367	0.4225	351.9	845.7	1197.5	762.1	1113.3	0.5401	1.0082	1.5483	379

* 1 atmo (standard atmosphere) = 760 mms. of Hg. by definition = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.
For water, at 345°(126 lbs.), sp. vol., v' or σ = 0.0179 cu. ft. per lb.; 1/v' = 55.8 lbs. per cu. ft.; 144 Apv' = 0.42 B.t.u.;
at 370°(173 lbs.), v' or σ = 0.0183 ; 1/v' = 54.8 " ; 144 A v' = 0.59 " .

Table 1: Temperatures

Temp. Fahr.	Pressure lbs.	Atmos	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Steam	Entropy Water	Evap.	Steam	Temp. Fahr.
t	p	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or σ	L/T or r/T	N or ϕ	t
380°	195.6	13.31	2.340	0.427	352.9	844.8	1197.7	761.2	1113.5	0.5413	1.0060	1.5473	380°
381	197.9	13.47	2.313	0.432	354.0	844.0	1197.9	760.3	1113.6	0.5426	1.0038	1.5464	381
382	200.3	13.63	2.287	0.437	355.0	843.1	1198.1	759.4	1113.8	0.5439	1.0015	1.5454	382
383	202.7	13.79	2.261	0.442	356.1	842.2	1198.3	758.5	1113.9	0.5452	0.9993	1.5445	383
384	205.1	13.96	2.236	0.447	357.2	841.3	1198.5	757.6	1114.1	0.5464	0.9971	1.5435	384
385°	207.6	14.13	2.211	0.452	358.2	840.5	1198.7	756.7	1114.2	0.5476	0.9950	1.5426	385°
386	210.0	14.30	2.186	0.457	359.3	839.6	1198.9	755.8	1114.4	0.5488	0.9928	1.5416	386
387	212.6	14.47	2.161	0.463	360.3	838.7	1199.0	754.9	1114.5	0.5501	0.9906	1.5407	387
388	215.1	14.64	2.137	0.468	361.4	837.8	1199.2	754.0	1114.6	0.5513	0.9884	1.5397	388
389	217.6	14.81	2.113	0.473	362.4	837.0	1199.4	753.1	1114.8	0.5526	0.9862	1.5388	389
390°	220.2	14.98	2.089	0.479	363.5	836.1	1199.6	752.2	1114.9	0.5539	0.9840	1.5379	390°
391	222.8	15.16	2.066	0.484	364.6	835.2	1199.8	751.3	1115.1	0.5552	0.9818	1.5370	391
392	225.4	15.34	2.043	0.489	365.6	834.3	1199.9	750.4	1115.2	0.5565	0.9796	1.5361	392
393	228.0	15.52	2.021	0.495	366.7	833.4	1200.1	749.4	1115.3	0.5577	0.9774	1.5351	393
394	230.7	15.70	1.999	0.500	367.7	832.5	1200.3	748.5	1115.4	0.5590	0.9752	1.5342	394
395°	233.4	15.88	1.977	0.506	368.8	831.6	1200.4	747.6	1115.6	0.5603	0.9730	1.5333	395°
396	236.1	16.07	1.955	0.512	369.9	830.7	1200.6	746.7	1115.7	0.5615	0.9708	1.5323	396
397	238.8	16.25	1.934	0.517	370.9	829.9	1200.8	745.8	1115.9	0.5627	0.9687	1.5314	397
398	241.5	16.43	1.913	0.523	372.0	829.0	1201.0	744.8	1116.0	0.5639	0.9665	1.5304	398
399	244.3	16.62	1.892	0.529	373.0	828.1	1201.1	743.9	1116.1	0.5651	0.9644	1.5295	399
400°	247.1	16.81	1.872	0.534	374.1	827.2	1201.3	743.0	1116.3	0.5663	0.9623	1.5286	400°
410	276.4	18.80	1.679	0.596	384.7	818.2	1202.9	733.8	1117.6	0.5786	0.9409	1.5195	410
420	308.4	20.97	1.510	0.662	395.4	809.0	1204.4	724.5	1118.9	0.5908	0.9198	1.5106	420
430	343.2	23.34	1.361	0.735	406.2	799.6	1205.8	715.1	1120.0	0.6029	0.8990	1.5019	430
440	380.8	25.91	1.229	0.814	417.0	790.1	1207.1	705.5	1121.1	0.6149	0.8785	1.4934	440
450°	422.	28.7	1.11	0.90	428.	780.	1208.	695.	1122.	0.627	0.858	1.485	450°
460	466.	31.7	1.00	1.00	439.	770.	1209.	685.	1123.	0.639	0.837	1.476	460
470	514.	35.0	0.91	1.10	450.	760.	1210.	675.	1124.	0.651	0.817	1.468	470
480	565.	38.4	0.83	1.21	462.	749.	1211.	664.	1124.	0.662	0.797	1.459	480
490	620.	42.2	0.75	1.32	473.	738.	1211.	654.	1125.	0.674	0.777	1.451	490
500°	679.	46.2	0.69	1.45	484.	727.	1211.	643.	1125.	0.686	0.757	1.443	500°
510	743.	50.5	0.63	1.59	496.	715.	1211.	632.	1125.	0.698	0.737	1.435	510
520	810.	55.1	0.57	1.74	507.	703.	1210.	620.	1125.	0.709	0.718	1.427	520
530	883.	60.1	0.52	1.91	519.	690.	1209.	608.	1124.	0.721	0.698	1.418	530
540	960.	65.3	0.48	2.08	531.	677.	1208.	596.	1123.	0.732	0.678	1.409	540
550°	1043.	70.9	0.44	2.28	542.	664.	1206.	583.	1121.	0.743	0.657	1.400	550°
560	1130.	76.9	0.40	2.49	554.	650.	1204.	570.	1119.	0.754	0.637	1.391	560
570	1224.	83.3	0.37	2.71	566.	635.	1201.	556.	1117.	0.765	0.616	1.381	570
580	1323.	90.0	0.34	2.96	578.	619.	1197.	542.	1115.	0.776	0.595	1.371	580
590	1428.	97.2	0.31	3.23	591.	602.	1193.	527.	1112.	0.787	0.574	1.361	590
600°	1540.	104.8	0.28	3.53	604.	585.	1189.	511.	1108.	0.799	0.552	1.351	600°
610	1658.	112.8	0.26	3.9		566.		494.			0.530		610
620	1783.	121.3	0.24	4.2		546.		476.			0.506		620
630	1916.	130.4	0.22	4.6		525.		457.			0.482		630
640	2056.	139.9	0.20	5.1		501.		436.			0.456		640
650°	2204.	150.0	0.18	5.6		475.		413.			0.428		650°
660	2361.	160.6	0.16	6.2		446.		387.			0.398		660
670	2526.	171.9	0.14	6.9		411.		357.			0.364		670
690	2883.	196.2	0.10	9.0		316.		274.			0.275		690
706.1	3200.	217.8	0.50	20.1		000.		000.			0.000		706.1

$T°=t°+459.6$; $J=777.5$ ft. lbs. per B.t.u. [log=2.89 071]; $A=1/J=1.286\times10^{-3}$; $144\,A=0.1852$ [log=$\bar{1}$.26 764).

For water, at 400° (247 lbs.), sp. vol., v′ or σ = 0.019 cu. ft. per lb.; $1/v'=53.5$ lbs. per cu. ft.; $144\,Apv'=0.86$ B.t.u.;
at 600° (1574 lbs.), " v′ or σ = 0.024 " ; $1/v'=42.0$ " ; $144\,Apv'=6.9$ " .

Table 2. Saturated Steam: Pressure Table

Press. lbs.	Temp. Deg. F.	Press. Atmos*	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Press lbs.
p	t	—	v or s	1/v	h or q	L or r	H	I or ρ	E	n or θ	L/T or r/T	N or ϕ	p
1	101.83	0.068	333.0	0.00300	69.8	1034.6	1104.4	972.9	1042.7	0.1327	1.8427	1.9754	1
2	126.15	0.136	173.5	0.00576	94.0	1021.0	1115.0	956.7	1050.7	0.1749	1.7431	1.9180	2
3	141.52	0.204	118.5	0.00845	109.4	1012.3	1121.6	946.4	1055.8	0.2008	1.6840	1.8848	3
4	153.01	0.272	90.5	0.01107	120.9	1005.7	1126.5	938.6	1059.5	0.2198	1.6416	1.8614	4
5	162.28	0.340	73.33	0.01364	130.1	1000.3	1130.5	932.4	1062.5	0.2348	1.6084	1.8432	5
6	170.06	0.408	61.89	0.01616	137.9	995.8	1133.7	927.0	1064.9	0.2471	1.5814	1.8285	6
7	176.85	0.476	53.56	0.01867	144.7	991.8	1136.5	922.4	1067.1	0.2579	1.5582	1.8161	7
8	182.86	0.544	47.27	0.02115	150.8	988.2	1139.0	918.2	1069.0	0.2673	1.5380	1.8053	8
9	188.27	0.612	42.36	0.02361	156.2	985.0	1141.1	914.4	1070.5	0.2756	1.5202	1.7958	9
10	193.22	0.680	38.38	0.02606	161.1	982.0	1143.1	910.9	1072.0	0.2832	1.5042	1.7874	10
11	197.75	0.748	35.10	0.02849	165.7	979.2	1144.9	907.8	1073.4	0.2902	1.4895	1.7797	11
12	201.96	0.816	32.36	0.03090	169.9	976.6	1146.5	904.8	1074.7	0.2967	1.4760	1.7727	12
13	205.87	0.885	30.03	0.03330	173.8	974.2	1148.0	902.0	1075.8	0.3025	1.4639	1.7664	13
14	209.55	0.953	28.02	0.03569	177.5	971.9	1149.4	899.3	1076.8	0.3081	1.4523	1.7604	14
14.7	212.00	1.000	26.79	0.03732	180.0	970.4	1150.4	897.6	1077.5	0.3118	1.4447	1.7565	14.7
15	213.0	1.021	26.27	0.03806	181.0	969.7	1150.7	896.8	1077.8	0.3133	1.4416	1.7549	15
16	216.3	1.089	24.79	0.04042	184.4	967.6	1152.0	894.4	1078.7	0.3183	1.4311	1.7494	16
17	219.4	1.157	23.38	0.04277	187.5	965.6	1153.1	892.1	1079.6	0.3229	1.4215	1.7444	17
18	222.4	1.225	22.16	0.04512	190.5	963.7	1154.2	889.9	1080.4	0.3273	1.4127	1.7400	18
19	225.2	1.293	21.07	0.04746	193.4	961.8	1155.2	887.8	1081.1	0.3315	1.4045	1.7360	19
20	228.0	1.361	20.08	0.04980	196.1	960.0	1156.2	885.8	1081.9	0.3355	1.3965	1.7320	20
21	230.6	1.429	19.18	0.05213	198.8	958.3	1157.1	883.9	1082.6	0.3393	1.3887	1.7280	21
22	233.1	1.497	18.37	0.05445	201.3	956.7	1158.0	882.0	1083.2	0.3430	1.3811	1.7241	22
23	235.5	1.565	17.62	0.05676	203.8	955.1	1158.8	880.2	1083.9	0.3465	1.3739	1.7204	23
24	237.8	1.633	16.93	0.05907	206.1	953.5	1159.6	878.5	1084.5	0.3499	1.3670	1.7169	24
25	240.1	1.701	16.30	0.0614	208.4	952.0	1160.4	876.8	1085.1	0.3532	1.3604	1.7136	25
26	242.2	1.769	15.72	0.0636	210.6	950.6	1161.2	875.1	1085.6	0.3564	1.3542	1.7106	26
27	244.4	1.837	15.18	0.0659	212.7	949.2	1161.9	873.5	1086.2	0.3594	1.3483	1.7077	27
28	246.4	1.905	14.67	0.0682	214.8	947.8	1162.6	872.0	1086.7	0.3623	1.3425	1.7048	28
29	248.4	1.973	14.19	0.0705	216.8	946.4	1163.2	870.5	1087.2	0.3652	1.3367	1.7019	29
30	250.3	2.041	13.74	0.0728	218.8	945.1	1163.9	869.0	1087.7	0.3680	1.3311	1.6991	30
31	252.2	2.109	13.32	0.0751	220.7	943.8	1164.5	867.6	1088.2	0.3707	1.3257	1.6964	31
32	254.1	2.178	12.93	0.0773	222.6	942.5	1165.1	866.2	1088.6	0.3733	1.3205	1.6938	32
33	255.8	2.246	12.57	0.0795	224.4	941.3	1165.7	864.8	1089.1	0.3759	1.3155	1.6914	33
34	257.6	2.314	12.22	0.0818	226.2	940.1	1166.3	863.4	1089.5	0.3784	1.3107	1.6891	34
35	259.3	2.382	11.89	0.0841	227.9	938.9	1166.8	862.1	1089.9	0.3808	1.3060	1.6868	35
36	261.0	2.450	11.58	0.0863	229.6	937.7	1167.3	860.8	1090.3	0.3832	1.3014	1.6846	36
37	262.6	2.518	11.29	0.0886	231.3	936.6	1167.8	859.5	1090.7	0.3855	1.2969	1.6824	37
38	264.2	2.586	11.01	0.0908	232.9	935.5	1168.4	858.3	1091.0	0.3877	1.2925	1.6802	38
39	265.8	2.654	10.74	0.0931	234.5	934.4	1168.9	857.1	1091.4	0.3899	1.2882	1.6781	39
40	267.3	2.722	10.49	0.0953	236.1	933.3	1169.4	855.9	1091.8	0.3920	1.2841	1.6761	40
41	268.7	2.790	10.25	0.0976	237.6	932.2	1169.8	854.7	1092.2	0.3941	1.2800	1.6741	41
42	270.2	2.858	10.02	0.0998	239.1	931.2	1170.3	853.6	1092.5	0.3962	1.2759	1.6721	42
43	271.7	2.926	9.80	0.1020	240.5	930.2	1170.7	852.4	1092.8	0.3982	1.2720	1.6702	43
44	273.1	2.994	9.59	0.1043	242.0	929.2	1171.2	851.3	1093.2	0.4002	1.2681	1.6683	44
45	274.5	3.062	9.39	0.1065	243.4	928.2	1171.6	850.3	1093.5	0.4021	1.2644	1.6665	45
46	275.8	3.130	9.20	0.1087	244.8	927.2	1172.0	849.2	1093.8	0.4040	1.2607	1.6647	46
47	277.2	3.198	9.02	0.1109	246.1	926.3	1172.4	848.1	1094.1	0.4059	1.2571	1.6630	47
48	278.5	3.266	8.84	0.1131	247.5	925.3	1172.8	847.1	1094.4	0.4077	1.2536	1.6613	48
49	279.8	3.334	8.67	0.1153	248.8	924.4	1173.2	846.1	1094.7	0.4095	1.2502	1.6597	49

* 1 atmo (standard atmosphere) = 760 mms. of Hg. by def. = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.

For water, at 15 lbs., sp. vol., v′ or σ = 0.0167 cu. ft. per lb.; 1/v′ = 59.8 lbs. per cu. ft.; 144 Apv′ = 0.05 B.t.u.;
at 40 lbs., v′ or σ = 0.0171 " ; 1/v′ = 58.3 " ; 144 Apv′ = 0.13 " .

Table 2: Pressures

Press. lbs. p	Temp. Deg. F. t	Press. Atmos —	Sp. Vol. cu. ft. per lb. v or s	Density lbs. per cu. ft. 1/v	Heat of the liquid h or q	Latent heat of evap. L or r	Total heat of steam H	Internal Energy B. t. u. Evap. I or ρ	Internal Energy B. t. u. Steam E	Entropy Water n or θ	Entropy Evap. L/T or r/T	Entropy Steam N or ϕ	Press. lbs. p
50	281.0	3.402	8.51	0.1175	250.1	923.5	1173.6	845.0	1095.0	0.4113	1.2468	1.6581	50
51	282.3	3.470	8.35	0.1197	251.4	922.6	1174.0	844.0	1095.3	0.4130	1.2435	1.6565	51
52	283.5	3.538	8.20	0.1219	252.6	921.7	1174.3	843.1	1095.5	0.4147	1.2402	1.6549	52
53	284.7	3.606	8.05	0.1241	253.9	920.8	1174.7	842.1	1095.8	0.4164	1.2370	1.6534	53
54	285.9	3.674	7.91	0.1263	255.1	919.9	1175.0	841.1	1096.1	0.4180	1.2339	1.6519	54
55	287.1	3.742	7.78	0.1285	256.3	919.0	1175.4	840.2	1096.3	0.4196	1.2309	1.6505	55
56	288.2	3.810	7.65	0.1307	257.5	918.2	1175.7	839.3	1096.6	0.4212	1.2278	1.6490	56
57	289.4	3.878	7.52	0.1329	258.7	917.4	1176.0	838.3	1096.8	0.4227	1.2248	1.6475	57
58	290.5	3.947	7.40	0.1350	259.8	916.5	1176.4	837.4	1097.1	0.4242	1.2218	1.6460	58
59	291.6	4.015	7.28	0.1372	261.0	915.7	1176.7	836.5	1097.3	0.4257	1.2189	1.6446	59
60	292.7	4.083	7.17	0.1394	262.1	914.9	1177.0	835.6	1097.6	0.4272	1.2160	1.6432	60
61	293.8	4.151	7.06	0.1416	263.2	914.1	1177.3	834.8	1097.8	0.4287	1.2132	1.6419	61
62	294.9	4.219	6.95	0.1438	264.3	913.3	1177.6	833.9	1098.0	0.4302	1.2104	1.6406	62
63	295.9	4.287	6.85	0.1460	265.4	912.5	1177.9	833.1	1098.2	0.4316	1.2077	1.6393	63
64	297.0	4.355	6.75	0.1482	266.4	911.8	1178.2	832.2	1098.4	0.4330	1.2050	1.6380	64
65	298.0	4.423	6.65	0.1503	267.5	911.0	1178.5	831.4	1098.7	0.4344	1.2024	1.6368	65
66	299.0	4.491	6.56	0.1525	268.5	910.2	1178.8	830.5	1098.9	0.4358	1.1998	1.6355	66
67	300.0	4.559	6.47	0.1547	269.6	909.5	1179.0	829.7	1099.1	0.4371	1.1972	1.6343	67
68	301.0	4.627	6.38	0.1569	270.6	908.7	1179.3	828.9	1099.3	0.4385	1.1946	1.6331	68
69	302.0	4.695	6.29	0.1590	271.6	908.0	1179.6	828.1	1099.5	0.4398	1.1921	1.6319	69
70	302.9	4.763	6.20	0.1612	272.6	907.2	1179.8	827.3	1099.7	0.4411	1.1896	1.6307	70
71	303.9	4.831	6.12	0.1634	273.6	906.5	1180.1	826.5	1099.9	0.4424	1.1872	1.6296	71
72	304.8	4.899	6.04	0.1656	274.5	905.8	1180.4	825.8	1100.1	0.4437	1.1848	1.6285	72
73	305.8	4.967	5.96	0.1678	275.5	905.1	1180.6	825.0	1100.3	0.4449	1.1825	1.6274	73
74	306.7	5.035	5.89	0.1699	276.5	904.4	1180.9	824.2	1100.5	0.4462	1.1801	1.6263	74
75	307.6	5.103	5.81	0.1721	277.4	903.7	1181.1	823.5	1100.6	0.4474	1.1778	1.6252	75
76	308.5	5.171	5.74	0.1743	278.3	903.0	1181.4	822.7	1100.8	0.4487	1.1755	1.6242	76
77	309.4	5.239	5.67	0.1764	279.3	902.3	1181.6	822.0	1101.0	0.4499	1.1732	1.6231	77
78	310.3	5.307	5.60	0.1786	280.2	901.7	1181.8	821.3	1101.2	0.4511	1.1710	1.6221	78
79	311.2	5.375	5.54	0.1808	281.1	901.0	1182.1	820.6	1101.4	0.4523	1.1687	1.6210	79
80	312.0	5.444	5.47	0.1829	282.0	900.3	1182.3	819.8	1101.6	0.4535	1.1665	1.6200	80
81	312.9	5.512	5.41	0.1851	282.9	899.7	1182.5	819.1	1101.7	0.4546	1.1644	1.6190	81
82	313.8	5.580	5.34	0.1873	283.8	899.0	1182.8	818.4	1101.9	0.4557	1.1623	1.6180	82
83	314.6	5.648	5.28	0.1894	284.6	898.4	1183.0	817.7	1102.1	0.4568	1.1602	1.6170	83
84	315.4	5.716	5.22	0.1915	285.5	897.7	1183.2	817.0	1102.2	0.4579	1.1581	1.6160	84
85	316.3	5.784	5.16	0.1937	286.3	897.1	1183.4	816.3	1102.4	0.4590	1.1561	1.6151	85
86	317.1	5.852	5.10	0.1959	287.2	896.4	1183.6	815.6	1102.6	0.4601	1.1540	1.6141	86
87	317.9	5.920	5.05	0.1980	288.0	895.8	1183.8	815.0	1102.7	0.4612	1.1520	1.6132	87
88	318.7	5.988	5.00	0.2001	288.9	895.2	1184.0	814.3	1102.9	0.4623	1.1500	1.6123	88
89	319.5	6.056	4.94	0.2023	289.7	894.6	1184.2	813.6	1103.0	0.4633	1.1481	1.6114	89
90	320.3	6.124	4.89	0.2044	290.5	893.9	1184.4	813.0	1103.2	0.4644	1.1461	1.6105	90
91	321.1	6.192	4.84	0.2065	291.3	893.3	1184.6	812.3	1103.3	0.4654	1.1442	1.6096	91
92	321.8	6.260	4.79	0.2087	292.1	892.7	1184.8	811.7	1103.5	0.4664	1.1423	1.6087	92
93	322.6	6.328	4.74	0.2109	292.9	892.1	1185.0	811.0	1103.6	0.4674	1.1404	1.6078	93
94	323.4	6.396	4.69	0.2130	293.7	891.5	1185.2	810.4	1103.8	0.4684	1.1385	1.6069	94
95	324.1	6.464	4.65	0.2151	294.5	890.9	1185.4	809.7	1103.9	0.4694	1.1367	1.6061	95
96	324.9	6.532	4.60	0.2172	295.3	890.3	1185.6	809.1	1104.1	0.4704	1.1348	1.6052	96
97	325.6	6.600	4.56	0.2193	296.1	889.7	1185.8	808.5	1104.2	0.4714	1.1330	1.6044	97
98	326.4	6.668	4.51	0.2215	296.8	889.2	1186.0	807.9	1104.4	0.4724	1.1312	1.6036	98
99	327.1	6.736	4.47	0.2237	297.6	888.6	1186.2	807.2	1104.5	0.4733	1.1295	1.6028	99

$T°=t°+459.6$; $J=777.5$ ft. lbs. per B.t.u. [log=2.89 071]; $A=1/J=1.286\times10^{-3}$; $144\,A=0.1852$ [log=$\bar{1}$.26 764].
For water, at 65 lbs., sp. vol., v' or $\sigma=0.0174$ cu. ft. per lb.; $1/v'=57.4$ lbs. per cu. ft.; $144\,Apv'=0.21$ B.t.u.;
at 90 lbs., v' or $\sigma=0.0176$ " ; $1/v'=56.8$ " ; $144\,Apv'=0.30$ " .

Table 2: Pressures

Press. lbs.	Temp. Deg. F.	Press Atmos*	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B.t.u. Evap.	Internal Energy B.t.u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Press lbs.
p	t	—	v or c	1/v	h or q	L or r	H	I or ρ	E	n or φ	L/T or r/T	N or Φ	p
100	327.8	6.80	4.429	0.2258	298.3	888.0	1186.3	806.6	1104.6	0.4743	1.1277	1.6020	100
101	328.6	6.87	4.388	0.2279	299.1	887.4	1186.5	806.0	1104.8	0.4752	1.1260	1.6012	101
102	329.3	6.94	4.347	0.2300	299.8	886.9	1186.7	805.4	1104.9	0.4762	1.1242	1.6004	102
103	330.0	7.01	4.307	0.2322	300.6	886.3	1186.9	804.8	1105.0	0.4771	1.1225	1.5996	103
104	330.7	7.08	4.268	0.2343	301.3	885.8	1187.0	804.2	1105.1	0.4780	1.1208	1.5988	104
105	331.4	7.14	4.230	0.2365	302.0	885.2	1187.2	803.6	1105.3	0.4789	1.1191	1.5980	105
106	332.0	7.21	4.192	0.2386	302.7	884.7	1187.4	803.0	1105.4	0.4798	1.1174	1.5972	106
107	332.7	7.28	4.155	0.2408	303.4	884.1	1187.5	802.5	1105.5	0.4807	1.1158	1.5965	107
108	333.4	7.35	4.118	0.2429	304.1	883.6	1187.7	801.9	1105.7	0.4816	1.1141	1.5957	108
109	334.1	7.42	4.082	0.2450	304.8	883.0	1187.9	801.3	1105.8	0.4825	1.1125	1.5950	109
110	334.8	7.49	4.047	0.2472	305.5	882.5	1188.0	800.7	1105.9	0.4834	1.1108	1.5942	110
111	335.4	7.55	4.012	0.2493	306.2	881.9	1188.2	800.2	1106.0	0.4843	1.1092	1.5935	111
112	336.1	7.62	3.978	0.2514	306.9	881.4	1188.4	799.6	1106.2	0.4852	1.1076	1.5928	112
113	336.8	7.69	3.945	0.2535	307.6	880.9	1188.5	799.0	1106.3	0.4860	1.1061	1.5921	113
114	337.4	7.76	3.912	0.2556	308.3	880.4	1188.7	798.5	1106.4	0.4869	1.1045	1.5914	114
115	338.1	7.83	3.880	0.2577	309.0	879.8	1188.8	797.9	1106.5	0.4877	1.1030	1.5907	115
116	338.7	7.89	3.848	0.2599	309.6	879.3	1189.0	797.4	1106.6	0.4886	1.1014	1.5900	116
117	339.4	7.96	3.817	0.2620	310.3	878.8	1189.1	796.8	1106.8	0.4894	1.0999	1.5893	117
118	340.0	8.03	3.786	0.2641	311.0	878.3	1189.3	796.3	1106.9	0.4903	1.0984	1.5887	118
119	340.6	8.10	3.756	0.2662	311.6	877.8	1189.4	795.7	1107.0	0.4911	1.0969	1.5880	119
120	341.3	8.17	3.726	0.2683	312.3	877.2	1189.6	795.2	1107.1	0.4919	1.0954	1.5873	120
121	341.9	8.23	3.697	0.2705	313.0	876.7	1189.7	794.7	1107.2	0.4927	1.0939	1.5866	121
122	342.5	8.30	3.668	0.2726	313.6	876.2	1189.8	794.2	1107.3	0.4935	1.0924	1.5859	122
123	343.2	8.37	3.639	0.2748	314.3	875.7	1190.0	793.6	1107.4	0.4943	1.0910	1.5853	123
124	343.8	8.44	3.611	0.2769	314.9	875.2	1190.1	793.1	1107.6	0.4951	1.0895	1.5846	124
125	344.4	8.50	3.583	0.2791	315.5	874.7	1190.3	792.6	1107.7	0.4959	1.0880	1.5839	125
126	345.0	8.57	3.556	0.2812	316.2	874.2	1190.4	792.0	1107.8	0.4967	1.0865	1.5832	126
127	345.6	8.64	3.530	0.2833	316.8	873.8	1190.5	791.5	1107.9	0.4974	1.0851	1.5825	127
128	346.2	8.71	3.504	0.2854	317.4	873.3	1190.7	791.0	1108.0	0.4982	1.0837	1.5819	128
129	346.8	8.78	3.478	0.2875	318.0	872.8	1190.8	790.5	1108.1	0.4990	1.0823	1.5813	129
130	347.4	8.85	3.452	0.2897	318.6	872.3	1191.0	790.0	1108.2	0.4998	1.0809	1.5807	130
131	348.0	8.91	3.427	0.2918	319.3	871.8	1191.1	789.5	1108.3	0.5005	1.0796	1.5801	131
132	348.5	8.98	3.402	0.2939	319.9	871.3	1191.2	789.0	1108.4	0.5013	1.0782	1.5795	132
133	349.1	9.05	3.378	0.2960	320.5	870.9	1191.3	788.5	1108.5	0.5020	1.0769	1.5789	133
134	349.7	9.12	3.354	0.2981	321.1	870.4	1191.5	788.0	1108.6	0.5028	1.0755	1.5783	134
135	350.3	9.19	3.331	0.3002	321.7	869.9	1191.6	787.5	1108.7	0.5035	1.0742	1.5777	135
136	350.8	9.25	3.308	0.3023	322.3	869.4	1191.7	787.0	1108.8	0.5043	1.0728	1.5771	136
137	351.4	9.32	3.285	0.3044	322.8	869.0	1191.8	786.5	1108.9	0.5050	1.0715	1.5765	137
138	352.0	9.39	3.263	0.3065	323.4	868.5	1192.0	786.0	1109.0	0.5057	1.0702	1.5759	138
139	352.5	9.46	3.241	0.3086	324.0	868.1	1192.1	785.5	1109.1	0.5064	1.0689	1.5753	139
140	353.1	9.53	3.219	0.3107	324.6	867.6	1192.2	785.0	1109.2	0.5072	1.0675	1.5747	140
141	353.6	9.59	3.197	0.3129	325.2	867.2	1192.3	784.6	1109.3	0.5079	1.0662	1.5741	141
142	354.2	9.66	3.175	0.3150	325.8	866.7	1192.5	784.1	1109.4	0.5086	1.0649	1.5735	142
143	354.7	9.73	3.154	0.3171	326.3	866.3	1192.6	783.6	1109.5	0.5093	1.0637	1.5730	143
144	355.3	9.80	3.133	0.3192	326.9	865.8	1192.7	783.2	1109.6	0.5100	1.0624	1.5724	144
145	355.8	9.87	3.112	0.3213	327.4	865.4	1192.8	782.7	1109.6	0.5107	1.0612	1.5719	145
146	356.3	9.93	3.092	0.3234	328.0	864.9	1192.9	782.2	1109.7	0.5114	1.0599	1.5713	146
147	356.9	10.00	3.072	0.3255	328.6	864.5	1193.0	781.7	1109.8	0.5121	1.0587	1.5708	147
148	357.4	10.07	3.052	0.3276	329.1	864.0	1193.2	781.3	1109.9	0.5128	1.0574	1.5702	148
149	357.9	10.14	3.033	0.3297	329.7	863.6	1193.3	780.8	1110.0	0.5135	1.0562	1.5697	149

* 1 atmo (standard atmosphere) = 760 mms. of Hg. by definition = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.

For water, at 115 lbs., sp. vol., v′ or σ = 0.0178 cu. ft. per lb.; 1/v′ = 56.0 lbs. per cu. ft.; 144 Apv′ = 0.38 B.t.u.;
at 140 lbs., v′ or σ = 0.0180 " ; 1/v′ = 55.4 " ; 144 Apv′ = 0.47 " .

Table 2: Pressures

Press. lbs. p	Temp. Deg. F. t	Press. Atmos —	Sp. Vol. cu. ft. per lb. v or s	Density lbs. per cu. ft. 1/v	Heat of the liquid h or q	Latent heat of evap. L or r	Total heat of steam H	Internal Energy B. t. u. Evap. I or ρ	Steam E	Entropy Water n or ϑ	Evap. L/T or r/T	Steam N or ϕ	Press. lbs. p
150	358.5	10.21	3.012	0.3320	330.2	863.2	1193.4	780.4	1110.1	0.5142	1.0550	1.5692	150
151	359.0	10.28	2.993	0.3341	330.8	862.7	1193.5	779.9	1110.2	0.5148	1.0538	1.5686	151
152	359.5	10.34	2.974	0.3362	331.4	862.3	1193.6	779.4	1110.3	0.5155	1.0525	1.5680	152
153	360.0	10.41	2.956	0.3383	331.9	861.8	1193.7	779.0	1110.4	0.5162	1.0513	1.5675	153
154	360.5	10.48	2.938	0.3404	332.4	861.4	1193.8	778.5	1110.4	0.5169	1.0501	1.5670	154
155	361.0	10.55	2.920	0.3425	332.9	861.0	1194.0	778.1	1110.5	0.5175	1.0489	1.5664	155
156	361.6	10.61	2.902	0.3446	333.5	860.6	1194.1	777.6	1110.6	0.5182	1.0477	1.5659	156
157	362.1	10.68	2.885	0.3467	334.0	860.1	1194.2	777.2	1110.7	0.5188	1.0466	1.5654	157
158	362.6	10.75	2.868	0.3488	334.6	859.7	1194.3	776.7	1110.8	0.5195	1.0454	1.5649	158
159	363.1	10.82	2.851	0.3508	335.1	859.3	1194.4	776.3	1110.8	0.5201	1.0443	1.5644	159
160	363.6	10.89	2.834	0.3529	335.6	858.8	1194.5	775.8	1110.9	0.5208	1.0431	1.5639	160
161	364.1	10.96	2.818	0.3549	336.2	858.4	1194.6	775.4	1111.0	0.5214	1.0420	1.5634	161
162	364.6	11.02	2.801	0.3570	336.7	858.0	1194.7	775.0	1111.1	0.5220	1.0409	1.5629	162
163	365.1	11.09	2.785	0.3591	337.2	857.6	1194.8	774.5	1111.2	0.5226	1.0398	1.5624	163
164	365.6	11.16	2.769	0.3612	337.7	857.2	1194.9	774.1	1111.2	0.5233	1.0387	1.5620	164
165	366.0	11.23	2.753	0.3633	338.2	856.8	1195.0	773.6	1111.3	0.5239	1.0376	1.5615	165
166	366.5	11.30	2.737	0.3654	338.7	856.4	1195.1	773.2	1111.4	0.5245	1.0365	1.5610	166
167	367.0	11.36	2.721	0.3675	339.2	855.9	1195.2	772.8	1111.4	0.5251	1.0354	1.5605	167
168	367.5	11.43	2.706	0.3696	339.7	855.5	1195.3	772.4	1111.5	0.5257	1.0343	1.5600	168
169	368.0	11.50	2.690	0.3717	340.2	855.1	1195.4	771.9	1111.6	0.5263	1.0332	1.5595	169
170	368.5	11.57	2.675	0.3738	340.7	854.7	1195.4	771.5	1111.7	0.5269	1.0321	1.5590	170
171	368.9	11.64	2.660	0.3759	341.2	854.3	1195.5	771.1	1111.7	0.5275	1.0311	1.5586	171
172	369.4	11.70	2.645	0.3780	341.7	853.9	1195.6	770.7	1111.8	0.5281	1.0300	1.5581	172
173	369.9	11.77	2.631	0.3801	342.2	853.5	1195.7	770.2	1111.9	0.5287	1.0289	1.5576	173
174	370.4	11.84	2.616	0.3822	342.7	853.1	1195.8	769.8	1112.0	0.5293	1.0278	1.5571	174
175	370.8	11.91	2.602	0.3843	343.2	852.7	1195.9	769.4	1112.0	0.5299	1.0268	1.5567	175
176	371.3	11.97	2.588	0.3864	343.7	852.3	1196.0	769.0	1112.1	0.5305	1.0257	1.5562	176
177	371.7	12.04	2.574	0.3885	344.2	851.9	1196.1	768.6	1112.2	0.5311	1.0246	1.5557	177
178	372.2	12.11	2.560	0.3906	344.7	851.5	1196.2	768.2	1112.3	0.5317	1.0235	1.5552	178
179	372.7	12.18	2.547	0.3927	345.2	851.2	1196.3	767.8	1112.4	0.5322	1.0225	1.5547	179
180	373.1	12.25	2.533	0.3948	345.6	850.8	1196.4	767.4	1112.4	0.5328	1.0215	1.5543	180
181	373.6	12.32	2.520	0.3969	346.1	850.4	1196.5	767.0	1112.5	0.5334	1.0205	1.5539	181
182	374.0	12.38	2.507	0.3989	346.6	850.0	1196.6	766.6	1112.6	0.5339	1.0195	1.5534	182
183	374.5	12.45	2.494	0.4010	347.1	849.6	1196.7	766.2	1112.6	0.5345	1.0185	1.5530	183
184	374.9	12.81	2.481	0.4031	347.6	849.2	1196.8	765.8	1112.7	0.5351	1.0174	1.5525	184
185	375.4	12.59	2.468	0.4052	348.0	848.8	1196.8	765.4	1112.8	0.5356	1.0164	1.5520	185
186	375.8	12.66	2.455	0.4073	348.5	848.4	1196.9	765.0	1112.8	0.5362	1.0154	1.5516	186
187	376.3	12.72	2.443	0.4094	349.0	848.0	1197.0	764.6	1112.9	0.5367	1.0144	1.5511	187
188	376.7	12.79	2.430	0.4115	349.4	847.7	1197.1	764.2	1113.0	0.5373	1.0134	1.5507	188
189	377.2	12.86	2.418	0.4136	349.9	847.3	1197.2	763.8	1113.0	0.5378	1.0124	1.5502	189
190	377.6	12.93	2.406	0.4157	350.4	846.9	1197.3	763.4	1113.1	0.5384	1.0114	1.5498	190
191	378.0	13.00	2.393	0.4178	350.8	846.5	1197.3	763.0	1113.2	0.5389	1.0105	1.5494	191
192	378.5	13.06	2.381	0.4199	351.3	846.1	1197.4	762.6	1113.2	0.5395	1.0095	1.5490	192
193	378.9	13.13	2.369	0.4220	351.7	845.8	1197.5	762.2	1113.3	0.5400	1.0085	1.5485	193
194	379.3	13.20	2.358	0.4241	352.2	845.4	1197.6	761.8	1113.4	0.5405	1.0076	1.5481	194
195	379.8	13.27	2.346	0.4262	352.7	845.0	1197.7	761.4	1113.4	0.5410	1.0066	1.5476	195
196	380.2	13.34	2.335	0.4283	353.1	844.7	1197.8	761.1	1113.5	0.5416	1.0056	1.5472	196
197	380.6	13.40	2.323	0.4304	353.6	844.3	1197.8	760.7	1113.6	0.5421	1.0047	1.5468	197
198	381.0	13.47	2.312	0.4325	354.0	843.9	1197.9	760.3	1113.6	0.5426	1.0038	1.5464	198
199	381.4	13.54	2.301	0.4346	354.4	843.6	1198.0	759.9	1113.7	0.5431	1.0029	1.5460	199

$T°=t°+459.6$; $J=777.5$ ft. lbs. per B.t.u. [log=2.89 071]; $A=1/J=1.286\times10^{-3}$; $144\,A=0.1852$ [log=$\bar{1}$.26 664].

For water, at 165 lbs., sp. vol., v′ or $\sigma=0.0182$ cu. ft. per lb.; $1/v'=54.9$ lbs. per cu. ft.; $144\,Apv'=0.56$ B.t.u.;
at 190 lbs., v′ or $\sigma=0.0184$ " ; $1/v'=54.5$ " ; $144\,Apv'=0.65$ " .

Table 2: Pressures

Press. lbs. p	Temp. Deg. F. t	Press. Atmos* —	Sp. Vol. cu. ft. per lb. v or s	Density lbs. per cu. ft. 1/v	Heat of the liquid h or q	Latent heat of evap. L or r	Total heat of steam H	Internal Energy B. t. u. Evap. I or ρ	Internal Energy B. t. u. Steam E	Entropy Water n or φ	Entropy Evap. L/T or r/T	Entropy Steam N or Φ	Press. lbs. p
200	381.9	13.61	2.290	0.437	354.9	843.2	1198.1	759.5	1113.7	0.5437	1.0019	1.5456	200
201	382.3	13.68	2.279	0.439	355.3	842.8	1198.2	759.2	1113.8	0.5442	1.0010	1.5452	201
202	382.7	13.74	2.269	0.441	355.8	842.4	1198.2	758.8	1113.9	0.5447	1.0001	1.5448	202
203	383.1	13.81	2.258	0.443	356.2	842.1	1198.3	758.4	1113.9	0.5452	0.9992	1.5444	203
204	383.5	13.88	2.247	0.445	356.7	841.7	1198.4	758.0	1114.0	0.5458	0.9982	1.5440	204
205	384.0	13.95	2.237	0.447	357.1	841.4	1198.5	757.6	1114.0	0.5463	0.9973	1.5436	205
206	384.4	14.02	2.227	0.449	357.5	841.0	1198.5	757.3	1114.1	0.5468	0.9964	1.5432	206
207	384.8	14.08	2.217	0.451	358.0	840.6	1198.6	756.9	1114.2	0.5473	0.9955	1.5428	207
208	385.2	14.15	2.207	0.453	358.4	840.3	1198.7	756.5	1114.2	0.5478	0.9946	1.5424	208
209	385.6	14.22	2.197	0.455	358.8	839.9	1198.8	756.2	1114.3	0.5483	0.9937	1.5420	209
210	386.0	14.29	2.187	0.457	359.2	839.6	1198.8	755.8	1114.4	0.5488	0.9928	1.5416	210
211	386.4	14.36	2.177	0.459	359.6	839.3	1198.9	755.5	1114.4	0.5493	0.9920	1.5413	211
212	386.8	14.43	2.167	0.461	360.1	838.9	1199.0	755.1	1114.5	0.5498	0.9911	1.5409	212
213	387.2	14.49	2.158	0.463	360.5	838.6	1199.1	754.7	1114.5	0.5503	0.9902	1.5405	213
214	387.6	14.56	2.148	0.466	360.9	838.2	1199.1	754.4	1114.6	0.5508	0.9893	1.5401	214
215	388.0	14.63	2.138	0.468	361.4	837.9	1199.2	754.0	1114.6	0.5513	0.9885	1.5398	215
216	388.4	14.70	2.128	0.470	361.8	837.5	1199.3	753.7	1114.7	0.5518	0.9876	1.5394	216
217	388.8	14.77	2.118	0.472	362.2	837.2	1199.4	753.3	1114.7	0.5523	0.9867	1.5390	217
218	389.1	14.83	2.109	0.474	362.6	836.8	1199.4	753.0	1114.8	0.5528	0.9858	1.5386	218
219	389.5	14.90	2.100	0.476	363.0	836.5	1199.5	752.6	1114.8	0.5533	0.9850	1.5383	219
220	389.9	14.97	2.091	0.478	363.4	836.2	1199.6	752.3	1114.9	0.5538	0.9841	1.5379	220
221	390.3	15.04	2.082	0.480	363.8	835.8	1199.6	751.9	1115.0	0.5543	0.9833	1.5376	221
222	390.7	15.11	2.073	0.482	364.2	835.5	1199.7	751.6	1115.0	0.5548	0.9824	1.5372	222
223	391.1	15.17	2.064	0.485	364.6	835.1	1199.8	751.2	1115.1	0.5553	0.9816	1.5369	223
224	391.5	15.24	2.055	0.487	365.0	834.8	1199.8	750.8	1115.1	0.5557	0.9808	1.5365	224
225	391.9	15.31	2.046	0.489	365.5	834.4	1199.9	750.5	1115.2	0.5562	0.9799	1.5361	225
226	392.2	15.38	2.038	0.491	365.9	834.1	1200.0	750.1	1115.2	0.5567	0.9791	1.5358	226
227	392.6	15.45	2.030	0.493	366.3	833.8	1200.0	749.8	1115.3	0.5572	0.9783	1.5355	227
228	393.0	15.51	2.021	0.495	366.7	833.4	1200.1	749.4	1115.3	0.5577	0.9774	1.5351	228
229	393.4	15.58	2.013	0.497	367.1	833.1	1200.2	749.1	1115.4	0.5582	0.9766	1.5348	229
230	393.8	15.65	2.004	0.499	367.5	832.8	1200.2	748.8	1115.4	0.5586	0.9758	1.5344	230
231	394.1	15.72	1.996	0.501	367.9	832.4	1200.3	748.4	1115.5	0.5591	0.9750	1.5341	231
232	394.5	15.79	1.988	0.503	368.3	832.1	1200.4	748.1	1115.5	0.5596	0.9741	1.5337	232
233	394.9	15.86	1.980	0.505	368.7	831.8	1200.4	747.7	1115.6	0.5601	0.9733	1.5334	233
234	395.2	15.92	1.972	0.507	369.0	831.4	1200.5	747.4	1115.6	0.5605	0.9725	1.5330	234
235	395.6	15.99	1.964	0.509	369.4	831.1	1200.6	747.0	1115.7	0.5610	0.9717	1.5327	235
236	396.0	16.06	1.956	0.511	369.8	830.8	1200.6	746.7	1115.7	0.5615	0.9708	1.5323	236
237	396.4	16.13	1.948	0.513	370.2	830.4	1200.7	746.4	1115.8	0.5619	0.9700	1.5319	237
238	396.7	16.20	1.940	0.515	370.6	830.1	1200.7	746.0	1115.8	0.5624	0.9692	1.5316	238
239	397.1	16.26	1.932	0.518	371.0	829.8	1200.8	745.7	1115.9	0.5629	0.9684	1.5313	239
240	397.4	16.33	1.924	0.520	371.4	829.5	1200.9	745.4	1115.9	0.5633	0.9676	1.5309	240
241	397.8	16.40	1.917	0.522	371.8	829.2	1200.9	745.0	1116.0	0.5638	0.9668	1.5306	241
242	398.2	16.47	1.909	0.524	372.2	828.8	1201.0	744.7	1116.0	0.5642	0.9661	1.5303	242
243	398.5	16.53	1.902	0.526	372.6	828.5	1201.1	744.4	1116.1	0.5647	0.9653	1.5300	243
244	398.9	16.60	1.894	0.528	372.9	828.2	1201.1	744.0	1116.1	0.5651	0.9646	1.5297	244
245	399.3	16.67	1.887	0.530	373.3	827.9	1201.2	743.7	1116.2	0.5655	0.9638	1.5293	245
246	399.6	16.74	1.879	0.532	373.7	827.5	1201.2	743.4	1116.2	0.5659	0.9630	1.5289	246
247	400.0	16.81	1.872	0.534	374.1	827.2	1201.3	743.0	1116.3	0.5663	0.9623	1.5286	247
248	400.3	16.88	1.864	0.536	374.5	826.9	1201.4	742.7	1116.3	0.5668	0.9615	1.5283	248
249	400.7	16.94	1.857	0.538	374.8	826.6	1201.4	742.4	1116.4	0.5672	0.9607	1.5279	249

* 1 atmo (standard atmosphere) = 760 mms. of Hg. by def. = 29.921 ins. of Hg. = 14.696 lbs. per sq. in.

For water, at 215 lbs., sp. vol., v′ or σ = 0.0185 cu. ft. per lb.; 1/v′ = 54.0 lbs. per cu. ft.; 144 Apv′ = 0.74 B. t. u.;
at 240 lbs., v′ or σ = 0.0186 " ; 1/v′ = 53.6 " ; 144 Apv′ = 0.83 " .

Table 2: Pressures

Press. lbs.	Temp. Deg. F.	Press. Atmos	Sp. Vol. cu. ft. per lb.	Density lbs. per cu. ft.	Heat of the liquid	Latent heat of evap.	Total heat of steam	Internal Energy B. t. u. Evap.	Internal Energy B. t. u. Steam	Entropy Water	Entropy Evap.	Entropy Steam	Press. lbs.
p	t	—	v or s	1/v	h or q	L or r	H	i or ρ	E	n or σ	L/T or r/T	N or ϕ	p
250	401.1	17.01	1.850	0.541	375.2	826.3	1201.5	742.0	1116.4	0.5676	0.9600	1.5276	250
252	401.8	17.15	1.836	0.545	376.0	825.6	1201.6	741.4	1116.5	0.5685	0.9584	1.5269	252
254	402.4	17.28	1.822	0.549	376.7	825.0	1201.7	740.8	1116.6	0.5694	0.9569	1.5263	254
256	403.1	17.42	1.809	0.553	377.5	824.4	1201.8	740.1	1116.7	0.5702	0.9554	1.5256	256
258	403.8	17.56	1.795	0.557	378.2	823.7	1201.9	739.5	1116.8	0.5711	0.9539	1.5250	258
260	404.5	17.69	1.782	0.561	378.9	823.1	1202.1	738.9	1116.9	0.5719	0.9525	1.5244	260
262	405.2	17.83	1.769	0.565	379.6	822.5	1202.2	738.2	1117.0	0.5727	0.9511	1.5238	262
264	405.9	17.96	1.756	0.569	380.4	821.9	1202.3	737.6	1117.1	0.5735	0.9497	1.5232	264
266	406.6	18.10	1.743	0.574	381.1	821.3	1202.4	737.0	1117.2	0.5744	0.9482	1.5226	266
268	407.2	18.24	1.731	0.578	381.8	820.7	1202.5	736.4	1117.2	0.5752	0.9468	1.5220	268
270	407.9	18.37	1.718	0.582	382.5	820.1	1202.6	735.8	1117.3	0.5760	0.9454	1.5214	270
272	408.6	18.51	1.705	0.587	383.2	819.5	1202.7	735.1	1117.4	0.5768	0.9440	1.5208	272
274	409.2	18.64	1.693	0.591	383.9	818.9	1202.8	734.5	1117.5	0.5776	0.9426	1.5202	274
276	409.9	18.78	1.681	0.595	384.6	818.3	1202.9	733.9	1117.6	0.5784	0.9412	1.5196	276
278	410.5	18.92	1.669	0.599	385.3	817.7	1203.0	733.3	1117.6	0.5792	0.9398	1.5190	278
280	411.2	19.05	1.658	0.603	386.0	817.1	1203.1	732.7	1117.7	0.5800	0.9385	1.5185	280
282	411.8	19.19	1.646	0.608	386.7	816.5	1203.2	732.1	1117.8	0.5808	0.9371	1.5179	282
284	412.4	19.32	1.635	0 612	387.4	815.9	1203.3	731.5	1117.9	0.5816	0.9357	1.5173	284
286	413.1	19.46	1.624	0.616	388.1	815.4	1203.4	730.9	1118.0	0.5824	0.9344	1.5168	286
288	413.7	19.60	1.613	0.620	388.7	814.8	1203.5	730.3	1118.1	0.5832	0.9330	1.5162	288
290	414.4	19.73	1.602	0.624	389.4	814.2	1203.6	729.7	1118.1	0.5840	0.9316	1.5156	290
292	415.0	19.87	1.591	0.629	390.1	813.6	1203.7	729.2	1118.2	0.5848	0.9302	1.5150	292
294	415.6	20.01	1.581	0.633	390.8	813.0	1203.8	728.6	1118.3	0.5856	0.9289	1.5145	294
296	416.2	20.14	1.571	0.637	391.4	812.5	1203.9	728.0	1118.4	0.5863	0.9276	1.5139	296
298	416.8	20.28	1.561	0.641	392.1	811.9	1204.0	727.4	1118.4	0.5871	0.9263	1.5134	298
300	417.5	20.41	1.551	0.645	392.7	811.3	1204.1	726.8	1118.5	0.5878	0.9251	1.5129	300
310	420.5	21.09	1.502	0.666	395.9	808.5	1204.5	724.0	1118.9	0.5915	0.9187	1.5102	310
320	423.4	21.78	1.456	0.687	399.1	805.8	1204.9	721.2	1119.2	0.5951	0.9125	1.5076	320
330	426.3	22.46	1.413	0.708	402.2	803.1	1205.3	718.5	1119.6	0.5986	0.9065	1.5051	330
340	429.1	23.14	1.372	0.729	405.3	800.4	1205.7	715.9	1119.9	0.6020	0.9006	1.5026	340
350	431.9	23.82	1.334	0.750	408.2	797.8	1206.1	713.3	1120.2	0.6053	0.8949	1.5002	350
360	434.6	24.50	1.298	0.770	411.2	795.3	1206.4	710.7	1120.5	0.6085	0.8894	1.4979	360
370	437.2	25.18	1.264	0.791	414.0	792.8	1206.8	708.2	1120.8	0.6116	0.8840	1.4956	370
380	439.8	25.86	1.231	0.812	416.8	790.3	1207.1	705.7	1121.1	0.6147	0.8788	1.4935	380
390	442.3	26.54	1.200	0.833	419.5	787.9	1207.4	703.3	1121.4	0.6178	0.8737	1.4915	390
400	444.7	27.22	1.17	0.86	422.	786.	1208.	701.	1122.	0.621	0.868	1.489	400
410	447.2	27.90	1.14	0.88	425.	783.	1208.	699.	1122.	0.624	0.863	1.487	410
420	449.6	28.58	1.11	0.90	427.	780.	1208.	696.	1122.	0.627	0.858	1.485	420
430	451.9	29.26	1.09	0.92	430.	778.	1208.	694.	1122.	0.629	0.854	1.483	430
440	454.2	29.94	1.06	0.94	433.	776.	1208.	692.	1122.	0.632	0.849	1.481	440
450	456.5	30.62	1.04	0.96	435.	774.	1209.	690.	1123.	0.635	0.844	1.479	450
460	458.7	31.30	1.01	0.99	438.	771.	1209.	687.	1123.	0.637	0.840	1.477	460
470	460.9	31.98	0.99	1.01	440.	769.	1209.	685.	1123.	0.640	0.835	1.475	470
480	463.0	32.66	0.97	1.03	443.	767.	1209.	683.	1123.	0.643	0.831	1.474	480
490	465.1	33.34	0.95	1.05	445.	764.	1210.	680.	1124.	0.645	0.827	1.472	490
500	467.2	34.02	0.93	1.08	448.	762.	1210.	678.	1124.	0.648	0.823	1.471	500
525	472.3	35.72	0.89	1.12	453.	757.	1210.	673.	1124.	0.654	0.813	1.467	525
550	477.2	37.42	0.85	1.18	458.	752.	1210.	668.	1125.	0.659	0.803	1.462	550
575	481.9	39.13	0.81	1.24	464.	747.	1211.	663.	1125.	0.664	0.794	1.458	575
600	486.4	40.83	0.781	.28	469.	742.	1211.	658.	1125.	0.670	0.784	1.454	600

$T° = t° + 459.6$; $J = 777.5$ ft. lbs. per B.t.u. [log = 2.89 071]; $A = 1/J = 1.286 \times 10^{-3}$; $144\,A = 0.1852$ [log = $\bar{1}$.26 764].
For water, at 280 lbs., sp. vol., v′ or $\sigma = 0.0189$ cu. ft. per lb.; $1/v' = 53.0$ lbs. per cu. ft.; $144\,Apv' = 0.98$ B.t.u.;
at 450 lbs., v′ or $\sigma = 0.0197$ " ; $1/v' = 50.8$ " ; $144\,Apv' = .165$ " .

Table 3: Saturated and Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
1	t	101.7		111.7	121.7	131.7	141.7	151.7	161.7	171.7	181.7	191.7	201.7	211.7	221.7
	v	0.0	333.0	339.3	345.5	351.7	357.8	363.9	369.9	375.9	381.9	387.9	393.9	399.9	405.8
	h	69.8	1104.4	1108.9	1113.4	1118.0	1122.6	1127.1	1131.7	1136.2	1140.8	1145.3	1149.9	1154.5	1159.0
	n	0.1327	1.9754	1.9836	1.9915	1.9993	2.0069	2.0144	2.0218	2.0291	2.0363	2.0434	2.0503	2.0571	2.0638
2	t	126.1		136.1	146.1	156.1	166.1	176.1	186.1	196.1	206.1	216.1	226.1	236.1	246.1
	v	0.0	173.5	176.7	179.8	183.0	186.1	189.2	192.2	195.2	198.2	201.2	204.2	207.2	210.2
	h	94.0	1115.0	1119.5	1124.1	1128.7	1133.2	1137.8	1142.3	1146.9	1151.5	1156.1	1160.7	1165.3	1169.8
	n	0.1749	1.9180	1.9259	1.9336	1.9412	1.9486	1.9559	1.9630	1.9699	1.9768	1.9836	1.9904	1.9971	2.0036
3	t	141.5		151.5	161.5	171.5	181.5	191.5	201.5	211.5	221.5	231.5	241.5	251.5	261.5
	v	0.0	118.5	120.7	122.8	124.9	127.0	129.0	131.0	133.0	135.1	137.1	139.1	141.1	143.1
	h	109.3	1121.6	1126.2	1130.8	1135.4	1139.9	1144.5	1149.0	1153.6	1158.2	1162.8	1167.4	1172.0	1176.5
	n	0.2008	1.8848	1.8927	1.9002	1.9077	1.9150	1.9221	1.9289	1.9356	1.9423	1.9490	1.9557	1.9623	1.9687
4	t	153.0		163.0	173.0	183.0	193.0	203.0	213.0	223.0	233.0	243.0	253.0	263.0	273.0
	v	0.0	90.5	92.1	93.7	95.3	96.8	98.4	99.9	101.4	102.9	104.4	106.0	107.5	109.0
	h	120.9	1126.5	1131.1	1135.7	1140.3	1144.9	1149.5	1154.0	1158.6	1163.2	1167.8	1172.4	1177.0	1181.6
	n	0.2198	1.8614	1.8690	1.8764	1.8838	1.8910	1.8980	1.9048	1.9115	1.9182	1.9249	1.9316	1.9382	1.9446
5	t	162.3		172.3	182.3	192.3	202.3	212.3	222.3	232.3	242.3	252.3	262.3	272.3	282.3
	v	0.0	73.3	74.6	75.9	77.2	78.4	79.7	80.9	82.1	83.3	84.5	85.7	86.9	88.2
	h	130.1	1130.5	1135.1	1139.7	1144.3	1148.9	1153.5	1158.0	1162.6	1167.2	1171.8	1176.4	1181.0	1185.6
	n	0.2348	1.8432	1.8507	1.8581	1.8654	1.8725	1.8794	1.8861	1.8927	1.8993	1.9059	1.9125	1.9189	1.9252
6	t	170.0		180.0	190.0	200.0	210.0	220.0	230.0	240.0	250.0	260.0	270.0	280.0	290.0
	v	0.0	61.9	63.0	64.0	65.1	66.1	67.2	68.2	69.2	70.2	71.2	72.2	73.2	74.2
	h	137.9	1133.7	1138.3	1141.9	1147.5	1152.1	1156.7	1161.3	1165.9	1170.5	1175.1	1179.8	1184.4	1189.0
	n	0.2471	1.8285	1.8360	1.8432	1.8504	1.8575	1.8643	1.8709	1.8775	1.8841	1.8906	1.8970	1.9033	1.9095
7	t	176.9		186.9	196.9	206.9	216.9	226.9	236.9	246.9	256.9	266.9	276.9	286.9	296.9
	v	0.0	53.6	54.5	55.4	56.3	57.2	58.1	58.9	59.8	60.7	61.6	62.4	63.3	64.2
	h	144.7	1136.5	1141.1	1145.7	1150.4	1155.0	1159.6	1164.2	1168.8	1173.4	1178.0	1182.7	1187.3	1191.9
	n	0.2579	1.8161	1.8235	1.8306	1.8377	1.8447	1.8515	1.8581	1.8647	1.8712	1.8776	1.8840	1.8902	1.8963
8	t	182.9		192.9	202.9	212.9	222.9	232.9	242.9	252.9	262.9	272.9	282.9	292.9	302.9
	v	0.0	47.3	48.1	48.9	49.7	50.4	51.2	52.0	52.8	53.5	54.3	55.0	55.8	56.6
	h	150.8	1139.0	1143.6	1148.2	1152.8	1157.5	1162.1	1166.7	1171.3	1176.0	1180.6	1185.2	1189.8	1194.4
	n	0.2673	1.8053	1.8126	1.8197	1.8267	1.8337	1.8404	1.8469	1.8534	1.8599	1.8663	1.8727	1.8788	1.8849
9	t	188.3		198.3	208.3	218.3	228.3	238.3	248.3	258.3	268.3	278.3	288.3	298.3	308.3
	v	0.0	42.4	43.1	43.8	44.5	45.2	45.9	46.6	47.2	47.9	48.6	49.3	49.9	50.6
	h	156.2	1141.1	1145.8	1150.4	1155.1	1159.7	1164.3	1168.9	1173.5	1178.2	1182.8	1187.4	1192.1	1196.7
	n	0.2756	1.7958	1.8030	1.8100	1.8170	1.8239	1.8306	1.8371	1.8436	1.8500	1.8563	1.8626	1.8687	1.8748
10	t	193.2		203.2	213.2	223.2	233.2	243.2	253.2	263.2	273.2	283.2	293.2	303.2	313.2
	v	0.0	38.4	39.0	39.7	40.3	40.9	41.5	42.2	42.8	43.4	44.0	44.6	45.2	45.8
	h	161.1	1143.1	1147.7	1152.4	1157.1	1161.7	1166.3	1171.0	1175.6	1180.3	1184.9	1189.5	1194.2	1198.8
	n	0.2832	1.7874	1.7946	1.8015	1.8084	1.8153	1.8220	1.8285	1.8349	1.8413	1.8476	1.8538	1.8599	1.8659
11	t	197.8		207.8	217.8	227.8	237.8	247.8	257.8	267.8	277.8	287.8	297.8	307.8	317.8
	v	0.0	35.1	35.7	36.3	36.8	37.4	38.0	38.5	39.1	39.7	40.2	40.8	41.3	41.9
	h	165.7	1144.9	1149.5	1154.2	1158.9	1163.5	1168.2	1172.8	1177.4	1182.1	1186.8	1191.4	1196.1	1200.7
	n	0.2902	1.7797	1.7868	1.7937	1.8006	1.8075	1.8141	1.8205	1.8269	1.8333	1.8396	1.8458	1.8519	1.8579
12	t	202.0		212.0	222.0	232.0	242.0	252.0	262.0	272.0	282.0	292.0	302.0	312.0	322.0
	v	0.0	32.4	32.9	33.4	34.0	34.5	35.0	35.5	36.0	36.5	37.0	37.5	38.0	38.6
	h	169.9	1146.5	1151.2	1155.9	1160.6	1165.2	1169.9	1174.5	1179.1	1183.8	1188.5	1193.1	1197.8	1202.5
	n	0.2967	1.7727	1.7797	1.7866	1.7935	1.8003	1.8069	1.8133	1.8197	1.8260	1.8322	1.8384	1.8445	1.8505

t is the temperature, in Fahrenheit degrees; h is the total heat, in B. t. u., from water at 32°;
v is the specific volume, in cu. ft. per lb.; n is the entropy, from water at 32°.

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
231.7	241.7	251.7	261.7	271.7	281.7	291.7	301.7	351.7	401.7	451.7	501.7	601.7	701.7	t 1
411.8	417.8	423.8	429.8	435.7	441.7	447.7	453.7	483.5	513.4	543.2	573.1	632.7	692.4	v
1163.6	1168.2	1172.8	1177.4	1182.0	1186.5	1191.0	1195.6	1218.5	1241.5	1264.5	1287.6	1334.1	1381.0	h
2.0704	2.0770	2.0835	2.0899	2.0962	2.1024	2.1085	2.1145	2.1426	2.1701	2.1964	2.2218	2.2679	2.3100	n
256.1	266.1	276.1	286.1	296.1	306.1	316.1	326.1	376.1	426.1	476.1	526.1	626.1	726.1	t 2
213.2	216.2	219.2	222.2	225.2	228.2	231.2	234.2	249.1	264.1	279.0	293.9	323.8	353.6	v
1174.4	1179.0	1183.6	1188.1	1192.7	1197.2	1201.8	1206.4	1229.4	1252.4	1275.5	1298.6	1345.2	1392.2	h
2.0100	2.0162	2.0223	2.0284	2.0345	2.0406	2.0468	2.0529	2.0802	2.1071	2.1333	2.1586	2.2044	2.2459	n
271.5	281.5	291.5	301.5	311.5	321.5	331.5	341.5	391.5	441.5	491.5	541.5	641.5	741.5	t 3
145.1	147.1	149.1	151.1	153.1	155.1	157.1	159.1	169.1	179.1	189.0	199.0	218.9	238.8	v
1181.1	1185.7	1190.3	1194.9	1199.5	1204.0	1208.6	1213.2	1236.2	1259.3	1282.4	1305.6	1352.4	1399.4	h
1.9749	1.9809	1.9869	1.9929	1.9989	2.0049	2.0110	2.0170	2.0438	2.0703	2.0962	2.1213	2.1669	2.2081	n
283.0	293.0	303.0	313.0	323.0	333.0	343.0	353.0	403.0	453.0	503.0	553.0	653.0	753.0	t 4
110.5	112.0	113.5	115.0	116.5	118.0	119.5	121.0	128.5	136.0	143.5	150.9	165.9	180.8	v
1186.2	1190.8	1195.4	1200.0	1204.6	1209.1	1213.7	1218.3	1241.4	1264.5	1287.6	1310.9	1357.7	1404.8	h
1.9505	1.9563	1.9621	1.9680	1.9739	1.9898	1.9857	1.9916	2.0184	2.0445	2.0700	2.0948	2.1392	2.1803	n
292.3	302.3	312.3	322.3	332.3	342.3	352.3	362.3	412.3	462.3	512.3	562.3	662.3	762.3	t 5
8.94	9.06	91.8	93.0	94.2	95.4	96.6	97.8	103.8	109.8	115.8	121.8	133.7	145.7	v
1190.2	1194.9	1199.5	1204.1	1208.7	1213.3	1217.9	1222.5	1245.6	1268.7	1291.9	1315.2	1362.1	1409.3	h
1.9311	1.9369	1.9428	1.9487	1.9546	1.9604	1.9662	1.9720	1.9987	2.0246	2.0496	2.0739	2.1179	2.1586	n
300.0	310.0	320.0	330.0	340.0	350.0	360.0	370.0	420.0	470.0	520.0	570.0	670.0	770.0	t 6
75.2	76.2	77.2	78.3	79.3	80.3	81.3	82.3	87.3	92.3	97.3	102.3	112.2	122.2	v
1193.6	1198.2	1202.8	1207.4	1212.0	1216.6	1221.2	1225.9	1249.0	1272.2	1295.4	1318.7	1365.7	1413.0	h
1.9154	1.9213	1.9272	1.9330	1.9388	1.9445	1.9503	1.9561	1.9827	2.0085	2.0331	2.0568	2.1006	2.1410	n
306.9	316.9	326.9	336.9	346.9	356.9	366.9	376.9	426.9	476.9	526.9	576.9	676.9	776.9	t 7
65.1	66.0	66.8	67.6	68.5	69.3	70.2	71.1	75.4	79.6	83.9	88.2	96.8	105.3	v
1196.5	1201.2	1205.8	1210.4	1215.0	1219.6	1224.2	1228.9	1252.1	1275.2	1298.4	1321.8	1368.9	1416.3	h
1.9023	1.9082	1.9141	1.9199	1.9256	1.9313	1.9370	1.9427	1.9693	1.9947	2.0192	2.0426	2.0860	2.1261	n
312.9	322.9	332.9	342.9	352.9	362.9	372.9	382.9	432.9	482.9	532.9	582.9	682.9	782.9	t 8
57.3	58.1	58.8	59.6	60.3	61.1	61.8	62.6	66.4	70.2	73.9	77.6	85.1	92.6	v
1199.0	1203.7	1208.3	1212.9	1217.6	1222.2	1226.8	1231.5	1254.7	1278.0	1301.2	1324.6	1371.6	1419.0	h
1.8909	1.8968	1.9026	1.9083	1.9140	1.9197	1.9254	1.9311	1.9576	1.9829	2.0071	2.0303	2.0734	2.1133	n
318.3	328.3	338.3	348.3	358.3	368.3	378.3	388.3	438.3	488.3	538.3	588.3	688.3	788.3	t 9
51.3	52.0	52.6	53.3	54.0	54.7	55.3	56.0	59.4	62.7	66.0	69.3	76.0	82.7	v
1201.4	1206.0	1210.6	1215.2	1219.9	1224.5	1229.1	1233.8	1257.1	1280.3	1303.6	1327.0	1374.1	1421.6	h
1.8808	1.8867	1.8925	1.8982	1.9039	1.9096	1.9152	1.9208	1.9473	1.9725	1.9965	2.0195	2.0623	2.1020	n
323.2	333.2	343.2	353.2	363.2	373.2	383.2	393.2	443.2	493.2	543.2	593.2	693.2	793.2	t 10
46.4	47.0	47.7	48.3	48.9	49.5	50.1	50.7	53.7	56.7	59.7	62.7	68.7	74.7	v
1203.4	1208.1	1212.7	1217.3	1222.0	1226.7	1231.3	1236.0	1259.3	1282.5	1305.8	1329.3	1376.4	1424.0	h
1.8719	1.8778	1.8836	1.8893	1.8950	1.9006	1.9062	1.9117	1.9381	1.9632	1.9871	2.0099	2.0526	2.0920	n
327.8	337.8	347.8	357.8	367.8	377.8	387.8	397.8	447.8	497.8	547.8	597.8	697.8	797.8	t 11
42.4	43.0	43.5	44.1	44.6	45.2	45.8	46.3	49.0	51.8	54.5	57.2	62.7	68.2	v
1205.3	1210.0	1214.6	1219.2	1223.9	1228.6	1233.3	1238.0	1261.2	1284.5	1307.9	1331.4	1378.5	1426.1	h
1.8638	1.8696	1.8754	1.8811	1.8868	1.8924	1.8979	1.9035	1.9298	1.9547	1.9785	2.0012	2.0437	2.0829	n
332.0	342.0	352.0	362.0	372.0	382.0	392.0	402.0	452.0	502.0	552.0	602.0	702.0	802.0	t 12
39.1	39.6	40.1	40.6	41.1	41.6	42.1	42.6	45.2	47.7	50.2	52.7	57.7	62.7	v
1207.1	1211.8	1216.4	1221.0	1225.7	1230.4	1235.1	1239.8	1263.0	1286.3	1309.8	1333.3	1380.4	1428.0	h
1.8564	1.8622	1.8680	1.8737	1.8793	1.8849	1.8904	1.8959	1.9222	1.9471	1.9707	1.9933	2.0356	2.0747	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
13	t	205.9		215.9	225.9	235.9	245.9	255.9	265.9	275.9	285.9	295.9	305.9	315.9	325.9
	v	0.02	30.03	30.53	31.02	31.51	32.00	32.48	32.96	33.43	33.90	34.38	34.85	35.32	35.79
	h	173.8	1148.0	1152.7	1157.4	1162.1	1166.8	1171.4	1176.1	1180.7	1185.4	1190.1	1194.8	1199.5	1204.1
	n	0.3025	1.7664	1.7734	1.7803	1.7871	1.7938	1.8004	1.8069	1.8132	1.8195	1.8257	1.8319	1.8379	1.8438
14	t	209.6		219.6	229.6	239.6	249.6	259.6	269.6	279.6	289.6	299.6	309.6	319.6	329.6
	v	0.02	28.02	28.48	28.94	29.40	29.85	30.30	30.74	31.18	31.62	32.06	32.50	32.94	33.38
	h	177.5	1149.4	1154.1	1158.8	1163.5	1168.2	1172.9	1177.5	1182.2	1186.9	1191.6	1196.2	1200.9	1205.5
	n	0.3081	1.7604	1.7674	1.7742	1.7810	1.7877	1.7943	1.8007	1.8070	1.8132	1.8194	1.8256	1.8317	1.8376
15	t	213.0		223.0	233.0	243.0	253.0	263.0	273.0	283.0	293.0	303.0	313.0	323.0	333.0
	v	0.02	26.27	26.70	27.13	27.56	27.98	28.40	28.82	29.23	29.64	30.05	30.46	30.87	31.28
	h	181.0	1150.7	1155.4	1160.1	1164.8	1169.5	1174.2	1178.9	1183.6	1188.3	1192.9	1197.6	1202.3	1206.9
	n	0.3133	1.7549	1.7618	1.7686	1.7754	1.7821	1.7886	1.7950	1.8013	1.8075	1.8137	1.8199	1.8259	1.8318
16	t	216.3		226.3	236.3	246.3	256.3	266.3	276.3	286.3	296.3	306.3	316.3	326.3	336.3
	v	0.02	24.74	25.14	25.54	25.94	26.34	26.73	27.12	27.51	27.90	28.28	28.67	29.06	29.44
	h	184.4	1152.0	1156.7	1161.4	1166.1	1170.8	1175.5	1180.2	1184.9	1189.6	1194.2	1198.9	1203.6	1208.3
	n	0.3183	1.7494	1.7563	1.7631	1.7698	1.7765	1.7830	1.7894	1.7957	1.8019	1.8080	1.8141	1.8201	1.8260
17	t	219.4		229.4	239.4	249.4	259.4	269.4	279.4	289.4	299.4	309.4	319.4	329.4	339.4
	v	0.02	23.38	23.76	24.13	24.51	24.89	25.26	25.63	25.99	26.36	26.73	27.09	27.45	27.81
	h	187.5	1153.1	1157.8	1162.5	1167.3	1172.0	1176.7	1181.4	1186.1	1190.8	1195.5	1200.2	1204.9	1209.6
	n	0.3229	1.7444	1.7513	1.7581	1.7648	1.7714	1.7779	1.7843	1.7906	1.7968	1.8029	1.8090	1.8150	1.8209
18	t	222.4		232.4	242.4	252.4	262.4	272.4	282.4	292.4	302.4	312.4	322.4	332.4	342.4
	v	0.02	22.16	22.52	22.88	23.24	23.59	23.94	24.29	24.64	24.99	25.33	25.67	26.02	26.36
	h	190.5	1154.2	1158.9	1163.6	1168.4	1173.1	1177.8	1182.5	1187.2	1191.9	1196.6	1201.3	1206.0	1210.7
	n	0.3273	1.7400	1.7468	1.7536	1.7603	1.7669	1.7734	1.7798	1.7861	1.7923	1.7984	1.8045	1.8104	1.8162
19	t	225.2		235.2	245.2	255.2	265.2	275.2	285.2	295.2	305.2	315.2	325.2	335.2	345.2
	v	0.02	21.07	21.41	21.75	22.09	22.43	22.76	23.09	23.42	23.75	24.08	24.40	24.73	25.05
	h	193.4	1155.2	1160.0	1164.7	1169.4	1174.2	1178.9	1183.6	1188.3	1193.0	1197.7	1202.4	1207.2	1211.9
	n	0.3315	1.7360	1.7428	1.7495	1.7562	1.7628	1.7693	1.7757	1.7820	1.7881	1.7942	1.8003	1.8063	1.8121
20	t	228.0		238.0	248.0	258.0	268.0	278.0	288.0	298.0	308.0	318.0	328.0	338.0	348.0
	v	0.02	20.08	20.41	20.73	21.05	21.37	21.69	22.01	22.32	22.63	22.94	23.25	23.56	23.87
	h	196.1	1156.2	1160.9	1165.7	1170.4	1175.2	1179.9	1184.6	1189.3	1194.1	1198.8	1203.5	1208.3	1213.0
	n	0.3355	1.7320	1.7388	1.7456	1.7522	1.7587	1.7652	1.7716	1.7779	1.7840	1.7901	1.7961	1.8021	1.8080
21	t	230.6		240.6	250.6	260.6	270.6	280.6	290.6	300.6	310.6	320.6	330.6	340.6	350.6
	v	0.02	19.18	19.49	19.80	20.11	20.42	20.72	21.02	21.32	21.62	21.92	22.21	22.51	22.81
	h	198.8	1157.1	1161.9	1166.6	1171.4	1176.1	1180.9	1185.6	1190.3	1195.1	1199.8	1204.5	1209.3	1214.0
	n	0.3393	1.7280	1.7348	1.7415	1.7481	1.7547	1.7612	1.7675	1.7737	1.7799	1.7860	1.7921	1.7980	1.8038
22	t	233.1		243.1	253.1	263.1	273.1	283.1	293.1	303.1	313.1	323.1	333.1	343.1	353.1
	v	0.02	18.37	18.67	18.96	19.26	19.55	19.84	20.13	20.41	20.70	20.98	21.26	21.55	21.83
	h	201.3	1158.0	1162.8	1167.5	1172.3	1177.1	1181.8	1186.6	1191.3	1196.0	1200.8	1205.5	1210.3	1215.0
	n	0.3430	1.7241	1.7309	1.7376	1.7442	1.7507	1.7571	1.7635	1.7698	1.7759	1.7820	1.7881	1.7940	1.7998
23	t	235.5		245.5	255.5	265.5	275.5	285.5	295.5	305.5	315.5	325.5	335.5	345.5	355.5
	v	0.02	17.62	17.91	18.19	18.47	18.75	19.03	19.30	19.58	19.85	20.12	20.39	20.66	20.93
	h	203.8	1158.8	1163.6	1168.4	1173.2	1178.0	1182.7	1187.5	1192.2	1197.0	1201.7	1206.4	1211.2	1215.9
	n	0.3465	1.7204	1.7272	1.7339	1.7405	1.7470	1.7534	1.7598	1.7660	1.7721	1.7782	1.7843	1.7902	1.7960
24	t	237.8		247.8	257.8	267.8	277.8	287.8	297.8	307.8	317.8	327.8	337.8	347.8	357.8
	v	0.02	16.93	17.21	17.48	17.75	18.02	18.28	18.55	18.81	19.07	19.33	19.59	19.85	20.11
	h	206.1	1159.6	1164.4	1169.2	1174.0	1178.8	1183.6	1188.3	1193.0	1197.8	1202.6	1207.3	1212.1	1216.8
	n	0.3499	1.7169	1.7237	1.7303	1.7370	1.7435	1.7499	1.7562	1.7624	1.7686	1.7747	1.7807	1.7866	1.7924

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°. Internal energy
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071]. = total heat − 144 Apv.
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929]. Values for saturated steam
n = entropy. 144 A = 0.1852 [log = 1.26 764]. are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.	
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		
335.9	345.9	355.9	365.9	375.9	385.9	395.9	405.9	455.9	505.9	555.9	605.9	705.9	805.9	t	13
36.26	36.73	37.20	37.67	38.14	38.61	39.07	39.54	41.87	44.19	46.51	48.82	53.43	58.04	v	
1208.7	1213.4	1218.0	1222.7	1227.4	1232.0	1236.7	1241.4	1264.7	1288.1	1311.5	1335.0	1382.2	1429.8	h	
1.8497	1.8556	1.8614	1.8671	1.8727	1.8782	1.8837	1.8892	1.9154	1.9402	1.9637	1.9862	2.0284	2.0673	n	
339.6	349.6	359.6	369.6	379.6	389.6	399.6	409.6	459.6	509.6	559.6	609.6	709.6	809.6	t	14
33.82	34.26	34.69	35.13	35.56	36.00	36.43	36.86	39.03	41.19	43.34	45.49	49.78	54.06	v	
1210.2	1214.9	1219.6	1224.2	1228.9	1233.6	1238.3	1243.1	1266.3	1289.6	1313.1	1336.7	1383.9	1431.5	h	
1.8435	1.8493	1.8550	1.8606	1.8662	1.8718	1.8773	1.8827	1.9089	1.9336	1.9570	1.9795	2.0215	2.0603	n	
343.0	353.0	363.0	373.0	383.0	393.0	403.0	413.0	463.0	513.0	563.0	613.0	713.0	813.0	t	15
31.69	32.10	32.50	32.91	33.32	33.73	34.13	34.53	36.56	38.58	40.59	42.59	46.59	50.59	v	
1211.6	1216.3	1221.0	1225.6	1230.3	1235.0	1239.7	1244.4	1267.7	1291.1	1314.7	1338.3	1385.5	1433.2	h	
1.8377	1.8435	1.8492	1.8548	1.8604	1.8659	1.8714	1.8768	1.9029	1.9276	1.9509	1.9733	2.0152	2.0539	n	
346.3	356.3	366.3	376.3	386.3	396.3	406.3	416.3	466.3	516.3	566.3	616.3	716.3	816.3	t	16
29.82	30.21	30.59	30.97	31.36	31.74	32.12	32.50	34.40	36.29	38.17	40.05	43.81	47.55	v	
1213.0	1217.7	1222.4	1227.0	1231.7	1236.4	1241.1	1245.8	1269.2	1292.6	1316.1	1339.8	1387.0	1434.8	h	
1.8319	1.8377	1.8434	1.8490	1.8546	1.8601	1.8656	1.8710	1.8970	1.9216	1.9449	1.9672	2.0089	2.0475	n	
349.4	359.4	369.4	379.4	389.4	399.4	409.4	419.4	469.4	519.4	569.4	619.4	719.4	819.4	t	17
28.18	28.54	28.90	29.26	29.62	29.98	30.33	30.69	32.48	34.26	36.04	37.81	41.35	44.87	v	
1214.2	1218.9	1223.6	1228.3	1233.0	1237.7	1242.4	1247.1	1270.5	1294.0	1317.5	1341.1	1388.3	1436.1	h	
1.8267	1.8324	1.8381	1.8437	1.8493	1.8548	1.8602	1.8656	1.8916	1.9162	1.9394	1.9617	2.0033	2.0418	n	
352.4	362.4	372.4	382.4	392.4	402.4	412.4	422.4	472.4	522.4	572.4	622.4	722.4	822.4	t	18
26.70	27.04	27.39	27.73	28.07	28.41	28.74	29.08	30.77	32.46	34.14	35.81	39.15	42.48	v	
1215.4	1220.1	1224.8	1229.5	1234.2	1238.9	1243.6	1248.3	1271.8	1295.3	1318.8	1342.4	1389.7	1437.5	h	
1.8220	1.8278	1.8335	1.8391	1.8447	1.8502	1.8556	1.8609	1.8868	1.9114	1.9345	1.9568	1.9983	2.0367	n	
355.2	365.2	375.2	385.2	395.2	405.2	415.2	425.2	475.2	525.2	575.2	625.2	725.2	825.2	t	19
25.38	25.70	26.03	26.35	26.67	26.99	27.32	27.64	29.24	30.84	32.43	34.01	37.18	40.34	v	
1216.6	1221.3	1226.0	1230.7	1235.4	1240.1	1244.8	1249.5	1273.0	1296.5	1320.0	1343.6	1391.0	1438.8	h	
1.8179	1.8236	1.8293	1.8349	1.8404	1.8459	1.8513	1.8566	1.8825	1.9070	1.9301	1.9523	1.9938	2.0321	n	
358.0	368.0	378.0	388.0	398.0	408.0	418.0	428.0	478.0	528.0	578.0	628.0	728.0	828.0	t	20
24.18	24.49	24.80	25.11	25.41	25.72	26.02	26.33	27.85	29.37	30.88	32.39	35.40	38.40	v	
1217.7	1222.4	1227.1	1231.8	1236.5	1241.2	1245.9	1250.6	1274.1	1297.6	1321.2	1344.8	1392.2	1440.0	h	
1.8137	1.8194	1.8251	1.8307	1.8362	1.8417	1.8471	1.8524	1.8781	1.9026	1.9257	1.9479	1.9893	2.0275	n	
360.6	370.6	380.6	390.6	400.6	410.6	420.6	430.6	480.6	530.6	580.6	630.6	730.6	830.6	t	21
23.10	23.39	23.68	23.98	24.27	24.56	24.85	25.15	26.60	28.04	29.48	30.92	33.79	36.65	v	
1218.7	1223.4	1228.1	1232.8	1237.5	1242.2	1246.9	1251.7	1275.2	1298.7	1322.3	1346.0	1393.3	1441.1	h	
1.8096	1.8153	1.8209	1.8264	1.8319	1.8374	1.8428	1.8481	1.8738	1.8983	1.9213	1.9434	1.9848	2.0230	n	
363.1	373.1	383.1	393.1	403.1	413.1	423.1	433.1	483.1	533.1	583.1	633.1	733.1	833.1	t	22
22.11	22.39	22.67	22.95	23.23	23.51	23.79	24.06	25.45	26.83	28.21	29.58	32.32	35.05	v	
1219.7	1224.4	1229.1	1233.8	1238.5	1243.2	1249.0	1252.7	1276.3	1299.8	1323.4	1347.0	1394.4	1442.2	h	
1.8055	1.8112	1.8168	1.8224	1.8279	1.8333	1.8387	1.8440	1.8697	1.8941	1.9171	1.9392	1.9804	2.0186	n	
365.5	375.5	385.5	395.5	405.5	415.5	425.5	435.5	485.5	535.5	585.5	635.5	735.5	835.5	t	23
21.20	21.47	21.74	22.01	22.28	22.54	22.81	23.08	24.40	25.72	27.04	28.36	30.98	32.59	v	
1220.6	1225.3	1230.0	1234.8	1239.5	1244.2	1249.0	1253.7	1277.3	1300.8	1324.4	1348.1	1395.5	1443.3	h	
1.8017	1.8074	1.8130	1.8185	1.8240	1.8294	1.8348	1.8401	1.8657	1.8900	1.9131	1.9351	1.9763	2.0144	n	
367.8	377.8	387.8	397.8	407.8	417.8	427.8	437.8	487.8	537.8	587.8	637.8	737.8	837.8	t	24
20.37	20.63	20.89	21.14	21.40	21.66	21.91	22.17	23.44	24.71	25.97	27.23	29.74	32.25	v	
1221.5	1226.2	1231.0	1235.7	1240.4	1245.1	1249.9	1254.7	1278.2	1301.8	1325.4	1349.1	1396.5	1444.3	h	
1.7981	1.8037	1.8093	1.8148	1.8203	1.8258	1.8312	1.8365	1.8620	1.8863	1.9093	1.9313	1.9724	2.0105	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
25	t	240.1		250.1	260.1	270.1	280.1	290.1	300.1	310.1	320.1	330.1	340.1	350.1	360.1
	v	0.02	16.30	16.57	16.84	17.10	17.35	17.60	17.86	18.11	18.36	18.61	18.86	19.11	19.36
	h	208.4	1160.4	1165.2	1170.0	1174.8	1179.6	1184.4	1189.2	1193.9	1198.7	1203.4	1208.2	1213.0	1217.7
	n	0.3532	1.7136	1.7204	1.7271	1.7337	1.7402	1.7466	1.7529	1.7591	1.7652	1.7712	1.7772	1.7832	1.7890
26	t	242.2		252.2	262.2	272.2	282.2	292.2	302.2	312.2	322.2	332.2	342.2	352.2	362.2
	v	0.02	15.72	15.98	16.24	16.49	16.73	16.97	17.21	17.45	17.69	17.93	18.17	18.41	18.65
	h	210.6	1161.2	1166.0	1170.8	1175.6	1180:4	1185.2	1190.0	1194.7	1199.5	1204.2	1209.0	1213.8	1218.5
	n	0.3564	1.7106	1.7174	1.7240	1.7306	1.7371	1.7435	1.7498	1.7560	1.7622	1.7682	1.7742	1.7801	1.7859
27	t	244.4		254.4	264.4	274.4	284.4	294.4	304.4	314.4	324.4	334.4	344.4	354.4	364.4
	v	0.02	15.18	15.43	15.67	15.91	16.14	16.37	16.61	16.84	17.08	17.31	17.54	17.77	18.00
	h	212.7	1161.9	1166.7	1171.5	1176.4	1181.2	1186.0	1190.7	1195.5	1200.3	1205.1	1209.8	1214.6	1219.3
	n	0.3594	1.7077	1.7145	1.7211	1.7277	1.7342	1.7406	1.7469	1.7531	1.7592	1.7652	1.7712	1.7771	1.7829
28	t	246.4		256.4	266.4	276.4	286.4	296.4	306.4	316.4	326.4	336.4	346.4	356.4	366.4
	v	0.02	14.67	14.91	15.15	15.38	15.60	15.82	16.05	16.28	16.51	16.73	16.95	17.18	17.40
	h	214.8	1162.6	1167.4	1172.2	1177.1	1181.9	1186.7	1191.5	1196.2	1201.0	1205.8	1210.6	1215.4	1220.1
	n	0.3623	1.7048	1.7116	1.7182	1.7248	1.7313	1.7377	1.7440	1.7502	1.7563	1.7623	1.7683	1.7742	1.7800
29	t	248.4		258.4	268.4	278.4	288.4	298.4	308.4	318.4	328.4	338.4	348.4	358.4	368.4
	v	0.02	14.19	14.42	14.65	14.87	15.09	15.31	15.53	15.75	15.97	16.19	16.40	16.62	16.83
	h	216.8	1163.2	1168.1	1172.9	1177.8	1182.6	1187.4	1192.2	1197.0	1201.8	1206.6	1211.4	1216.2	1220.9
	n	0.3652	1.7019	1.7087	1.7153	1.7219	1.7283	1.7347	1.7410	1.7472	1.7533	1.7593	1.7653	1.7712	1.7770
30	t	250.4		260.4	270.4	280.4	290.4	300.4	310.4	320.4	330.4	340.4	350.4	360.4	370.4
	v	0.02	13.74	13.97	14.19	14.41	14.62	14.83	15.05	15.26	15.47	15.68	15.89	16.10	16.31
	h	218.8	1163.9	1168.8	1173.6	1178.5	1183.3	1188.1	1192.9	1197.7	1202.5	1207.3	1212.1	1216.9	1221.7
	n	0.3680	1.6991	1.7059	1.7125	1.7191	1.7255	1.7319	1.7382	1.7444	1.7505	1.7565	1.7625	1.7684	1.7741
31	t	252.3		262.3	272.3	282.3	292.3	302.3	312.3	322.3	332.3	342.3	352.3	362.3	372.3
	v	0.02	13.32	13.54	13.76	13.97	14.18	14.38	14.59	14.79	14.99	15.20	15.40	15.60	15.80
	h	220.7	1164.5	1169.4	1174.3	1179.1	1184.0	1188.8	1193.6	1198.4	1203.2	1208.0	1212.8	1217.6	1222.4
	n	0.3707	1.6964	1.7032	1.7098	1.7164	1.7228	1.7292	1.7354	1.7416	1.7477	1.7538	1.7597	1.7656	1.7713
32	t	254.1		264.1	274.1	284.1	294.1	304.1	314.1	324.1	334.1	344.1	354.1	364.1	374.1
	v	0.02	12.93	13.15	13.36	13.56	13.76	13.96	14.16	14.35	14.55	14.75	14.95	15.14	15.34
	h	222.6	1165.1	1170 0	1174.9	1179.8	1184.6	1189.4	1194.3	1199.1	1203.9	1208.7	1213.5	1218.3	1223.1
	n	0.3733	1.6938	1.7006	1.7072	1.7138	1.7202	1.7266	1.7328	1.7390	1.7451	1.7511	1.7571	1.7630	1.7687
33	t	255.8		265.8	275.8	285.8	295.8	305.8	315.8	325.8	335.8	345.8	355.8	365.8	375.8
	v	0.02	12.57	12.78	12.98	13.18	13.37	13.56	13.76	13.95	14.14	14.33	14.52	14.72	14.91
	h	224.4	1165.7	1170.6	1175.5	1180.4	1185.2	1190.1	1194.9	1199.7	1204.6	1209.4	1214.2	1219.0	1223.8
	n	0.3759	1.6914	1.6982	1.7048	1.7114	1.7178	1.7242	1.7304	1.7366	1.7427	1.7487	1.7546	1.7605	1.7662
34	t	257.6		267.6	277.6	287.6	297.6	307.6	317.6	327.6	337.6	347.6	357.6	367.6	377.6
	v	0.02	12.22	12.42	12.62	12.81	13.00	13.19	13.38	13.57	13.76	13.94	14.12	14.31	14.50
	h	226.2	1166.3	1171.2	1176.1	1181.0	1185.8	1190.7	1195.5	1200.3	1205.2	1210.0	1214.8	1219.6	1224.4
	n	0.3784	1.6890	1.6958	1.7024	1.7090	1.7154	1.7218	1.7280	1.7342	1.7402	1.7462	1.7522	1.7581	1.7638
35	t	259.3		269.3	279.3	289.3	299.3	309.3	319.3	329.3	339.3	349.3	359.3	369.3	379.3
	v	0.02	11.89	12.09	12.29	12.48	12.67	12.85	13.03	13.21	13.39	13.57	13.75	13.93	14.11
	h	227.9	1166.8	1171.7	1176.6	1181.5	1186.4	1191.3	1196.1	1201.0	1205.8	1210.6	1215.4	1220.2	1225.0
	n	0.3808	1.6868	1.6936	1.7002	1.7068	1.7132	1.7196	1.7258	1.7320	1.7380	1.7440	1.7500	1.7558	1.7615
36	t	261.0		271.0	281.0	291.0	301.0	311.0	321.0	331.0	341.0	351.0	361.0	371.0	381.0
	v	0.02	11.58	11.78	11.97	12.15	12.33	12.51	12.69	12.86	13.04	13.22	13.39	13.57	13 75
	h	229.6	1167.3	1172.3	1177.2	1182.1	1187.0	1191.8	1196.7	1201.5	1206.4	1211.2	1216.0	1220.8	1225.6
	n	0.3832	1.6846	1.6914	1.6980	1.7046	1.7110	1.7174	1.7236	1.7298	1.7358	1.7418	1.7478	1.7536	1.7593
37	t	262.6		272.6	282.6	292.6	302.6	312.6	322.6	332.6	342.6	352.6	362.6	372.6	382.6
	v	0.02	11.29	11.48	11.67	11.85	12.02	12.19	12.37	12.54	12.71	12.88	13.05	13.22	13.40
	h	231.3	1167.8	1172.8	1177.7	1182.6	1187.5	1192.4	1197.3	1202.1	1207.0	1211.8	1216.6	1221.4	1226.2
	n	0.3855	1.6824	1.6892	1.6958	1.7024	1.7088	1.7152	1.7214	1.7276	1.7336	1.7396	1.7455	1.7514	1.7571

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
370.1	380.1	390.1	400.1	410.1	420.1	430.1	440.1	490.1	540.1	590.1	640.1	740.1	840.1	t 25
19.61	19.86	20.10	20.35	20.60	20.84	21.08	21.32	22.55	23.77	24.99	26.20	28.61	31.01	v
1222.4	1227.1	1231.9	1236.6	1241.3	1246.0	1250.8	1255.6	1279.2	1302.8	1326.4	1350.1	1397.5	1445.4	h
1.7947	1.8004	1.8059	1.8114	1.8169	1.8223	1.8277	1.8330	1.8585	1.8827	1.9057	1.9277	1.9688	2.0078	n
372.2	382.2	392.2	402.2	412.2	422.2	432.2	442.2	492.2	542.2	592.2	642.2	742.2	842.2	t 26
18.89	19.13	19.37	19.61	19.85	20.09	20.32	20.55	21.74	22.91	24.07	25.24	27.56	29.82	v
1223.3	1228.0	1232.8	1237.5	1242.2	1246.9	1251.7	1256.5	1280.1	1303.7	1327.4	1351.1	1398.5	1446.3	h
1.7916	1.7972	1.8028	1.8083	1.8138	1.8192	1.8246	1.8298	1.8553	1.8795	1.9024	1.9244	1.9654	2.0034	n
374.4	384.4	394.4	404.4	414.4	424.4	434.4	444.4	494.4	544.4	594.4	644.4	744.4	844.4	t 27
18.24	18.47	18.70	18.93	19.16	19.38	19.61	19.84	20.97	22.10	23.23	24.35	26.59	28.81	v
1224.1	1228.8	1233.6	1238.3	1243.0	1247.7	1252.5	1257.3	1280.9	1304.6	1328.3	1352.0	1399.4	1447.3	h
1.7886	1.7942	1.7998	1.8053	1.8108	1.8162	1.8215	1.8268	1.8522	1.8763	1.8992	1.9212	1.9621	2.0001	n
376.4	386.4	396.4	406.4	416.4	426.4	436.4	446.4	496.4	546.4	596.4	646.4	746.4	846.4	t 28
17.62	17.84	18.06	18.28	18.51	18.73	18.95	19.17	20.26	21.35	22.44	23.52	25.68	27.83	v
1224.9	1229.6	1234.4	1239.1	1243.8	1248.6	1253.4	1258.1	1281.8	1305.4	1329.2	1352.8	1400.3	1448.2	h
1.7857	1.7913	1.7969	1.8024	1.8079	1.8133	1.8186	1.8239	1.8493	1.8734	1.8963	1.9183	1.9592	1.9972	n
378.4	388.4	398.4	408.4	418.4	428.4	438.4	448.4	498.4	548.4	598.4	648.4	748.4	848.4	t 29
17.05	17.26	17.48	17.69	17.91	18.12	18.33	18.55	19.61	20.66	21.70	22.75	24.83	26.91	v
1225.7	1230.4	1235.2	1239.9	1244.6	1249.4	1254.2	1258.9	1282.6	1306.3	1330.0	1353.7	1401.2	1449.0	h
1.7827	1.7883	1.7938	1.7993	1.8048	1.8102	1.8155	1.8207	1.8460	1.8702	1.8930	1.9149	1.9557	1.9936	n
380.4	390.4	400.4	410.4	420.4	430.4	440.4	450.4	500.4	550.4	600.4	650.4	750.4	850.4	t 30
16.52	16.73	16.93	17.14	17.35	17.55	17.76	17.97	18.99	20.00	21.02	22.03	24.05	26.05	v
1226.4	1231.2	1236.0	1240.7	1245.4	1250.2	1255.0	1259.7	1283.4	1307.1	1330.8	1354.5	1402.1	1449.9	h
1.7798	1.7854	1.7909	1.7964	1.8019	1.8073	1.8126	1.8178	1.8430	1.8672	1.8900	1.9118	1.9526	1.9904	n
382.3	392.3	402.3	412.3	422.3	432.3	442.3	452.3	502.3	552.3	602.3	652.3	752.3	852.3	t 31
16.01	16.21	16.41	16.61	16.81	17.01	17.21	17.41	18.40	19.39	20.37	21.35	23.30	25.24	v
1227.2	1231.9	1236.7	1241.4	1246.2	1250.9	1255.7	1260.5	1284.2	1307.9	1331.6	1355.3	1402.9	1450.7	h
1.7770	1.7826	1.7881	1.7936	1.7991	1.8045	1.8098	1.8150	1.8402	1.8643	1.8871	1.9089	1.9496	1.9874	n
384.1	394.1	404.1	414.1	424.1	434.1	444.1	454.1	504.1	554.1	604.1	654.1	754.1	854.1	t 32
15.54	15.73	15.92	16.12	16.31	16.51	16.70	16.89	17.85	18.81	19.77	20.71	22.60	24.48	v
1227.9	1232.6	1237.4	1242.1	1246.9	1251.6	1256.4	1261.2	1284.9	1308.6	1332.3	1356.1	1403.7	1451.6	h
1.7744	1.7799	1.7854	1.7909	1.7964	1.8018	1.8071	1.8123	1.8374	1.8615	1.8843	1.9060	1.9467	1.9845	n
385.8	395.8	405.8	415.8	425.8	435.8	445.8	455.8	505.8	555.8	605.8	655.8	755.8	855.8	t 33
15.10	15.29	15.48	15.66	15.85	16.04	16.23	16.42	17.35	18.28	19.20	20.12	21.95	23.78	v
1228.6	1233.3	1238.1	1242.8	1247.6	1252.4	1257.2	1261.9	1285.7	1309.4	1333.1	1356.9	1404.4	1452.3	h
1.7719	1.7775	1.7830	1.7884	1.7939	1.7993	1.8046	1.8098	1.8349	1.8590	1.8817	1.9034	1.9441	1.9818	n
387.6	397.6	407.6	417.6	427.6	437.6	447.6	457.6	507.6	557.6	607.6	657.6	757.6	857.6	t 34
14.68	14.87	15.05	15.23	15.42	15.60	15.79	15.97	16.87	17.77	18.67	19.56	21.34	23.12	v
1229.2	1234.0	1238.8	1243.5	1248.3	1253.0	1257.8	1262.6	1286.4	1310.1	1333.8	1357.6	1405.1	1453.1	h
1.7695	1.7751	1.7806	1.7860	1.7914	1.7968	1.8021	1.8073	1.8324	1.8564	1.8791	1.9008	1.9414	1.9791	n
389.3	399.3	409.3	419.3	429.3	439.3	449.3	459.3	509.3	559.3	609.3	659.3	759.3	859.3	t 35
14.29	14.47	14.65	14.83	15.01	15.18	15.36	15.54	16.42	17.30	18.17	19.04	20.76	22.49	v
1229.8	1234.6	1239.4	1244.2	1248.9	1253.7	1258.5	1263.3	1287.1	1310.8	1334.5	1358.3	1405.9	1453.8	h
1.7672	1.7728	1.7784	1.7838	1.7892	1.7946	1.7998	1.8050	1.8301	1.8541	1.8768	1.8984	1.9390	1.9766	n
391.0	401.0	411.0	421.0	431.0	441.0	451.0	461.0	511.0	561.0	611.0	661.0	761.0	861.0	t 36
13.92	14.09	14.27	14.44	14.61	14.79	14.96	15.13	16.00	16.85	17.69	18.54	20.22	21.89	v
1230.4	1235.2	1240.0	1244.8	1249.6	1254.3	1259.1	1263.9	1287.7	1311.5	1335.2	1359.0	1406.6	1454.5	h
1.7650	1.7705	1.7760	1.7815	1.7869	1.7923	1.7975	1.8027	1.8278	1.8518	1.8744	1.8960	1.9365	1.9741	n
392.6	402.6	412.6	422.6	432.6	442.6	452.6	462.6	512.6	562.6	612.6	662.6	762.6	862.6	t 37
13.57	13.74	13.91	14.08	14.24	14.41	14.58	14.74	15.59	16.42	17.24	18.06	19.70	21.32	v
1231.0	1235.8	1240.6	1245.4	1250.2	1255.0	1259.8	1264.6	1288.4	1312.2	1335.9	1359.7	1407.3	1455.3	h
1.7628	1.7683	1.7738	1.7793	1.7847	1.7900	1.7953	1.8005	1.8254	1.8494	1.8720	1.8936	1.9341	1.9716	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
38	t		264.2	274.2	284.2	294.2	304.2	314.2	324.2	334.2	344.2	354.2	364.2	374.2	384.2
	v	0.02	11.01	11.19	11.36	11.54	11.71	11.89	12.06	12.23	12.40	12.57	12.73	12.90	13.07
	h	232.9	1168.4	1173.3	1178.2	1183.2	1188.1	1193.0	1197.9	1202.7	1207.6	1212.4	1217.2	1222.0	1226.8
	n	0.3877	1.6802	1.6870	1.6937	1.7002	1.7066	1.7129	1.7192	1.7254	1.7314	1.7374	1.7433	1.7491	1.7548
39	t		265.8	275.8	285.8	295.8	305.8	315.8	325.8	335.8	345.8	355.8	365.8	375.8	385.8
	v	0.02	10.74	10.92	11.09	11.26	11.43	11.60	11.77	11.94	12.10	12.26	12.42	12.59	12.75
	h	234.5	1168.9	1173.8	1178.8	1183.7	1188.6	1193.5	1198.4	1203.3	1208.1	1213.0	1217.8	1222.7	1227.5
	n	0.3899	1.6781	1.6849	1.6915	1.6981	1.7045	1.7108	1.7171	1.7233	1.7293	1.7353	1.7412	1.7470	1.7527
40	t		267.3	277.3	287.3	297.3	307.3	317.3	327.3	337.3	347.3	357.3	367.3	377.3	387.3
	v	0.02	10.49	10.66	10.83	11.00	11.16	11.33	11.50	11.66	11.82	11.98	12.13	12.29	12.45
	h	236.0	1169.4	1174.3	1179.3	1184.2	1189.1	1194.0	1198.9	1203.8	1208.7	1213.5	1218.4	1223.2	1228.0
	n	0.3920	1.6761	1.6829	1.6895	1.6961	1.7025	1.7089	1.7151	1.7212	1.7273	1.7333	1.7392	1.7450	1.7507
41	t		268.7	278.7	288.7	298.7	308.7	318.7	328.7	338.7	348.7	358.7	368.7	378.7	388.7
	v	0.02	10.25	10.42	10.58	10.74	10.91	11.07	11.23	11.38	11.54	11.70	11.86	12.01	12.17
	h	237.6	1169.8	1174.8	1179.8	1184.8	1189.7	1194.6	1199.5	1204.3	1209.2	1214.1	1218.9	1223.8	1228.6
	n	0.3941	1.6741	1.6809	1.6875	1.6941	1.7005	1.7069	1.7131	1.7192	1.7253	1.7312	1.7371	1.7429	1.7486
42	t		270.2	280.2	290.2	300.2	310.2	320.2	330.2	340.2	350.2	360.2	370.2	380.2	390.2
	v	0.02	10.02	10.18	10.34	10.50	10.66	10.82	10.98	11.13	11.28	11.44	11.59	11.74	11.90
	h	239.1	1170.3	1175.3	1180.2	1185.2	1190.2	1195.1	1200.0	1204.8	1209.7	1214.6	1219.5	1224.4	1229.2
	n	0.3962	1.6721	1.6789	1.6855	1.6921	1.6985	1.7049	1.7111	1.7172	1.7233	1.7292	1.7351	1.7409	1.7466
43	t		271.7	281.7	291.7	301.7	311.7	321.7	331.7	341.7	351.7	361.7	371.7	381.7	391.7
	v	0.02	9.80	9.96	10.12	10.28	10.43	10.58	10.74	10.89	11.04	11.19	11.34	11.49	11.64
	h	240.5	1170.7	1175.7	1180.7	1185.7	1190.7	1195.6	1200.5	1205.4	1210.3	1215.1	1220.0	1224.9	1229.7
	n	0.3982	1.6702	1.6770	1.6836	1.6902	1.6966	1.7030	1.7092	1.7153	1.7214	1.7273	1.7332	1.7390	1.7447
44	t		273.1	283.1	293.1	303.1	313.1	323.1	333.1	343.1	353.1	363.1	373.1	383.1	393.1
	v	0.02	9.59	9.75	9.90	10.06	10.21	10.36	10.51	10.66	10.81	10.96	11.10	11.24	11.39
	h	242.0	1171.2	1176.2	1181.2	1186.2	1191.2	1196.1	1201.0	1205.9	1210.8	1215.6	1220.5	1225.4	1230.2
	n	0.4002	1.6683	1.6751	1.6817	1.6883	1.6947	1.7011	1.7073	1.7134	1.7195	1.7254	1.7313	1.7371	1.7427
45	t		274.5	284.5	294.5	304.5	314.5	324.5	334.5	344.5	354.5	364.5	374.5	384.5	394.5
	v	0.02	9.39	9.55	9.70	9.85	10.00	10.14	10.29	10.44	10.58	10.73	10.86	11.00	11.15
	h	243.4	1171.6	1176.6	1181.6	1186.6	1191.6	1196.6	1201.5	1206.4	1211.3	1216.2	1221.0	1225.9	1230.7
	n	0.4021	1.6665	1.6733	1.6799	1.6864	1.6929	1.6993	1.7055	1.7116	1.7177	1.7236	1.7295	1.7353	1.7409
46	t		275.8	285.8	295.8	305.8	315.8	325.8	335.8	345.8	355.8	365.8	375.8	385.8	395.8
	v	0.02	9.20	9.35	9.50	9.65	9.79	9.94	10.08	10.22	10.37	10.51	10.64	10.78	10.92
	h	244.8	1172.0	1177.1	1182.1	1187.1	1192.1	1197.0	1202.0	1206.9	1211.8	1216.7	1221.5	1226.4	1231.3
	n	0.4040	1.6647	1.6715	1.6781	1.6846	1.6911	1.6975	1.7037	1.7098	1.7159	1.7218	1.7277	1.7335	1.7391
47	t		277.2	287.2	297.2	307.2	317.2	327.2	337.2	347.2	357.2	367.2	377.2	387.2	397.2
	v	0.02	9.02	9.17	9.31	9.45	9.60	9.74	9.88	10.02	10.16	10.30	10.43	10.57	10.70
	h	246.1	1172.4	1177.5	1182.5	1187.5	1192.5	1197.5	1202.4	1207.3	1212.2	1217.1	1222.0	1226.9	1231.8
	n	0.4059	1.6630	1.6698	1.6764	1.6829	1.6894	1.6958	1.7020	1.7081	1.7142	1.7201	1.7260	1.7318	1.7374
48	t		278.5	288.5	298.5	308.5	318.5	328.5	338.5	348.5	358.5	368.5	378.5	388.5	398.5
	v	0.02	8.84	8.99	9.13	9.27	9.41	9.55	9.69	9.82	9.96	10.10	10.23	10.36	10.49
	h	247.5	1172.8	1177.9	1182.9	1187.9	1192.9	1197.9	1202.9	1207.8	1212.7	1217.6	1222.5	1227.4	1232.2
	n	0.4077	1.6613	1.6681	1.6747	1.6812	1.6877	1.6941	1.7003	1.7064	1.7125	1.7184	1.7243	1.7301	1.7357
49	t		279.8	289.8	299.8	309.8	319.8	329.8	339.8	349.8	359.8	369.8	379.8	389.8	399.8
	v	0.02	8.67	8.81	8.95	9.09	9.23	9.37	9.50	9.64	9.77	9.90	10.03	10.16	10.30
	h	248.8	1173.2	1178.3	1183.3	1188.4	1193.4	1198.4	1203.3	1208.2	1213.1	1218.0	1222.9	1227.8	1232.7
	n	0.4095	1.6597	1.6665	1.6732	1.6796	1.6861	1.6925	1.6987	1.7048	1.7109	1.7168	1.7227	1.7285	1.7341

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.8 9 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = $\bar{1}$.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat															
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		Press. lbs.
394.2	404.2	414.2	424.2	434.2	444.2	454.2	464.2	514.2	564.2	614.2	664.2	764.2	864.2	t	38
13.23	13.40	13.57	13.73	13.89	14.05	14.22	14.38	15.20	16.01	16.81	17.61	19.21	20.79	v	
1231.7	1236.5	1241.3	1246.0	1250.8	1255.6	1260.4	1265.2	1289.0	1312.8	1336.6	1360.4	1408.0	1456.0	h	
1.7604	1.7660	1.7715	1.7770	1.7824	1.7877	1.7930	1.7982	1.8232	1.8471	1.8696	1.8912	1.9317	1.9692	n	
395.8	405.8	415.8	425.8	435.8	445.8	455.8	465.8	515.8	565.8	615.8	665.8	765.8	865.8	t	39
12.92	13.08	13.24	13.40	13.56	13.72	13.87	14.03	14.83	15.62	16.40	17.18	18.74	20.28	v	
1232.8	1237.1	1241.9	1246.6	1251.4	1256.2	1261.0	1265.8	1289.7	1313.5	1337.2	1361.0	1408.6	1456.7	h	
1.7584	1.7639	1.7694	1.7748	1.7802	1.7856	1.7909	1.7960	1.8210	1.8448	1.8674	1.8889	1.9293	1.9668	n	
397.3	407.3	417.3	427.3	437.3	447.3	457.3	467.3	517.3	567.3	617.3	667.3	767.3	867.3	t	40
12.61	12.77	12.93	13.08	13.23	13.39	13.54	13.70	14.48	15.25	16.02	16.78	18.30	19.80	v	
1232.9	1237.7	1242.4	1247.2	1252.0	1256.8	1261.6	1266.4	1290.3	1314.1	1337.8	1361.6	1409.3	1457.4	h	
1.7564	1.7619	1.7674	1.7728	1.7782	1.7836	1.7888	1.7940	1.8189	1.8427	1.8652	1.8867	1.9271	1.9646	n	
398.7	408.7	418.7	428.7	438.7	448.7	458.7	468.7	518.7	568.7	618.7	668.7	768.7	868.7	t	41
12.32	12.48	12.63	12.79	12.93	13.08	13.23	13.38	14.15	14.90	15.65	16.39	17.87	19.34	v	
1233.4	1238.2	1243.0	1247.8	1252.6	1257.4	1262.2	1267.0	1290.9	1314.7	1338.5	1362.3	1410.0	1458.0	h	
1.7542	1.7598	1.7653	1.7707	1.7762	1.7815	1.7868	1.7919	1.8168	1.8406	1.8631	1.8845	1.9249	1.9624	n	
400.2	410.2	420.2	430.2	440.2	450.2	460.2	470.2	520.2	570.2	620.2	670.2	770.2	870.2	t	42
12.04	12.19	12.34	12.49	12.64	12.79	12.94	13.09	13.83	14.56	15.29	16.02	17.46	18.90	v	
1234.0	1238.8	1243.6	1248.4	1253.2	1258.0	1262.8	1267.6	1291.5	1315.3	1339.1	1362.9	1410.6	1458.6	h	
1.7523	1.7578	1.7633	1.7687	1.7741	1.7795	1.7847	1.7899	1.8147	1.8385	1.8609	1.8823	1.9227	1.9601	n	
401.7	411.7	421.7	431.7	441.7	451.7	461.7	471.7	521.7	571.7	621.7	671.7	771.7	871.7	t	43
11.78	11.93	12.08	12.22	12.37	12.52	12.66	12.80	13.53	14.25	14.96	15.67	17.08	18.48	v	
1234.5	1239.3	1244.1	1249.0	1253.8	1258.6	1263.4	1268.2	1292.1	1315.9	1339.7	1363.5	1411.2	1459.2	h	
1.7504	1.7559	1.7614	1.7668	1.7722	1.7775	1.7828	1.7879	1.8127	1.8364	1.8589	1.8803	1.9206	1.9580	n	
403.1	413.1	423.1	433.1	443.1	453.1	463.1	473.1	523.1	573.1	623.1	673.1	773.1	873.1	t	44
11.53	11.67	11.82	11.96	12.10	12.25	12.39	12.53	13.24	13.94	14.64	15.33	16.70	18.08	v	
1235.1	1239.9	1244.7	1249.5	1254.3	1259.1	1263.9	1268.7	1292.6	1316.4	1340.2	1364.0	1411.8	1459.8	h	
1.7483	1.7539	1.7595	1.7649	1.7703	1.7756	1.7808	1.7860	1.8108	1.8344	1.8568	1.8782	1.9185	1.9559	n	
404.5	414.5	424.5	434.5	444.5	454.5	464.5	474.5	524.5	574.5	624.5	674.5	774.5	874.5	t	45
11.29	11.43	11.57	11.71	11.85	11.99	12.13	12.27	12.96	13.65	14.33	15.01	16.36	17.70	v	
1235.6	1240.4	1245.2	1250.0	1254.8	1259.7	1264.5	1269.3	1293.2	1317.0	1340.8	1364.6	1412.4	1460.4	h	
1.7465	1.7521	1.7576	1.7630	1.7684	1.7737	1.7790	1.7841	1.8089	1.8325	1.8549	1.8762	1.9165	1.9539	n	
405.8	415.8	425.8	435.8	445.8	455.8	465.8	475.8	525.8	575.8	625.8	675.8	775.8	875.8	t	46
11.06	11.20	11.34	11.47	11.60	11.74	11.88	12.02	12.69	13.36	14.03	14.70	16.02	17.33	v	
1236.1	1240.9	1245.7	1250.6	1255.4	1260.2	1265.0	1269.8	1293.7	1317.5	1341.3	1365.2	1413.0	1461.0	h	
1.7447	1.7503	1.7558	1.7612	1.7666	1.7719	1.7771	1.7823	1.8071	1.8306	1.8530	1.8743	1.9145	1.9519	n	
407.2	417.2	427.2	437.2	447.2	457.2	467.2	477.2	527.2	577.2	627.2	677.2	777.2	877.2	t	47
10.84	10.98	11.11	11.24	11.38	11.51	11.64	11.78	12.44	13.10	13.75	14.40	15.69	16.98	v	
1236.6	1241.4	1246.2	1251.0	1255.8	1260.7	1265.5	1270.3	1294.3	1318.1	1341.9	1365.7	1413.5	1461.6	h	
1.7430	1.7486	1.7541	1.7595	1.7648	1.7701	1.7753	1.7805	1.8053	1.8288	1.8511	1.8724	1.9126	1.9500	n	
408.5	418.5	428.5	438.5	448.5	458.5	468.5	478.5	528.5	578.5	628.5	678.5	778.5	878.5	t	48
10.62	10.75	10.89	11.02	11.15	11.28	11.41	11.54	12.19	12.84	13.48	14.12	15.38	16.64	v	
1237.1	1241.9	1246.7	1251.6	1256.4	1261.2	1266.0	1270.8	1294.8	1318.6	1342.4	1366.3	1414.1	1462.2	h	
1.7413	1.7469	1.7524	1.7578	1.7631	1.7684	1.7736	1.7788	1.8035	1.8270	1.8493	1.8706	1.9107	1.9481	n	
409.8	419.8	429.8	439.8	449.8	459.8	469.8	479.8	529.8	579.8	629.8	679.8	779.8	879.8	t	49
10.43	10.55	10.68	10.81	10.94	11.07	11.19	11.32	11.96	12.59	13.22	13.85	15.09	16.32	v	
1237.6	1242.4	1247.2	1252.0	1256.8	1261.7	1266.5	1271.4	1295.3	1319.1	1342.9	1366.8	1414.6	1462.7	h	
1.7397	1.7453	1.7507	1.7561	1.7615	1.7668	1.7720	1.7771	1.8019	1.8253	1.8476	1.8688	1.9090	1.9463	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795]. To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
50	t	281.0		291.0	301.0	311.0	321.0	331.0	341.0	351.0	361.0	371.0	381.0	391.0	401.0
	v	0.02	8.51	8.65	8.78	8.92	9.06	9.19	9.32	9.45	9.58	9.71	9.84	9.97	10.10
	h	250.1	1173.6	1178.7	1183.7	1188.8	1193.8	1198.8	1203.8	1208.7	1213.6	1218.5	1223.4	1228.3	1233.2
	n	0.4113	1.6581	1.6649	1.6716	1.6782	1.6846	1.6909	1.6971	1.7032	1.7092	1.7152	1.7211	1.7269	1.7326
51	t	282.3		292.3	302.3	312.3	322.3	332.3	342.3	352.3	362.3	372.3	382.3	392.3	402.3
	v	0.02	8.35	8.49	8.62	8.76	8.89	9.02	9.15	9.28	9.41	9.53	9.66	9.79	9.91
	h	251.4	1174.0	1179.1	1184.1	1189.2	1194.2	1199.2	1204.2	1209.1	1214.0	1219.0	1223.9	1228.8	1233.6
	n	0.4130	1.6565	1.6633	1.6700	1.6766	1.6830	1.6893	1.6955	1.7016	1.7076	1.7136	1.7195	1.7253	1.7310
52	t	283.5		293.5	303.5	313.5	323.5	333.5	343.5	353.5	363.5	373.5	383.5	393.5	403.5
	v	0.02	8.21	8.34	8.47	8.60	8.73	8.86	8.99	9.12	9.24	9.36	9.49	9.61	9.74
	h	252.6	1174.3	1179.4	1184.5	1189.6	1194.6	1199.6	1204.6	1209.5	1214.4	1219.4	1224.3	1229.2	1234.1
	n	0.4147	1.6549	1.6617	1.6684	1.6750	1.6814	1.6877	1.6939	1.7001	1.7061	1.7020	1.7179	1.7237	1.7294
53	t	284.7		294.7	304.7	314.7	324.7	334.7	344.7	354.7	364.7	374.7	384.7	394.7	404.7
	v	0.02	8.05	8.19	8.32	8.45	8.58	8.70	8.83	8.96	9.08	9.20	9.32	9.44	9.56
	h	253.9	1174.7	1179.8	1184.9	1190.0	1195.0	1200.0	1205.0	1209.9	1214.9	1219.8	1224.7	1229.6	1234.5
	n	0.4164	1.6534	1.6602	1.6669	1.6735	1.6799	1.6862	1 6924	1.6986	1.7046	1.7105	1.7164	1.7222	1.7279
54	t	285.9		295.9	305.9	315.9	325.9	335.9	345.9	355.9	365 9	375.9	385.9	395.9	405.9
	v	0.02	7.91	8.04	8.17	8.30	8.43	8.55	8.67	8 80	8.92	9.04	9.16	9.28	9.40
	h	255.1	1175.0	1180.1	1185.2	1190.3	1195.4	1200.4	1205.4	1210 4	1215.3	1220.2	1225.1	1230.0	1234.9
	n	0.4180	1.6519	1.6587	1.6654	1.6720	1.6784	1.6847	1.6909	1.6971	1.7031	1.7090	1.7149	1 7207	1.7264
55	t	287.1		297.1	307.1	317.1	327.1	337.1	347.1	357.1	367.1	377.1	387.1	397.1	407.1
	v	0.02	7.78	7.91	8.03	8.16	8 28	8.40	8.52	8.64	8.76	8.88	9.00	9.12	9.24
	h	256.3	1175.4	1180.5	1185.6	1190.7	1195.8	1200.8	1205 8	1210 8	1215.7	1220.6	1225.6	1230.5	1235.4
	n	0.4196	1.6505	1.6573	1.6640	1.6706	1.6770	1.6833	1.6895	1.6957	1.7017	1.7076	1.7135	1.7193	1.7250
56	t	288.2		298.2	308.2	318.2	328.2	338.2	348.2	358.2	368.2	378.2	388.2	398.2	408.2
	v	0.02	7.65	7.78	7.90	8.02	8.14	8.26	8.38	8 50	8.62	8.74	8.85	8.96	9.08
	h	257.5	1175.7	1180.8	1185.9	1191.0	1196.1	1201.2	1206.2	1211.1	1216.1	1221.0	1225.9	1230.9	1235.8
	n	0.4212	1.6490	1.6558	1.6625	1.6691	1.6755	1.6818	1.6880	1.6941	1.7002	1.7062	1.7120	1.7178	1.7235
57	t	289.4		299.4	309.4	319.4	329.4	339.4	349.4	359.4	369.4	379.4	389.4	399.4	409.4
	v	0.02	7.52	7.65	7.77	7.89	8.01	8.13	8.24	8.36	8.48	8.59	8.70	8.82	8.94
	h	258.7	1176.0	1181.2	1186.3	1191.4	1196.5	1201.5	1206.5	1211.5	1216.5	1221.5	1226.4	1231.3	1236.2
	n	0.4227	1.6475	1.6543	1.6610	1.6676	1.6740	1.6803	1.6865	1.6926	1.6987	1.7047	1.7105	1.7163	1.7220
58	t	290.5		300.5	310.5	320.5	330.5	340.5	350.5	360.5	370.5	380.5	390.5	400.5	410.5
	v	0.02	7.40	7.52	7.64	7.76	7.88	8.00	8.11	8.23	8.34	8.45	8.57	8.68	8.79
	h	259.8	1176.4	1181.5	1186.6	1191.7	1196.8	1201.9	1206.9	1211.9	1216.9	1221.8	1226.8	1231.7	1236.6
	n	0.4242	1.6460	1.6528	1.6595	1.6661	1.6725	1.6788	1.6850	1.6911	1.6972	1.7032	1.7090	1.7148	1.7205
59	t	291.6		301.6	311.6	321.6	331.6	341.6	351.6	361.6	371.6	381.6	391.6	401.6	411.6
	v	0.02	7.28	7.40	7.52	7.64	7.76	7.87	7.98	8.10	8.21	8.32	8.43	8.54	8.65
	h	261.0	1176.7	1181.8	1187.0	1192.1	1197.2	1202.3	1207.3	1212.3	1217.3	1222.2	1227.2	1232.1	1237.0
	n	0.4257	1.6446	1.6514	1.6582	1.6648	1.6712	1.6775	1.6837	1.6898	1.6958	1.7017	1.7076	1.7134	1.7191
60	t	292.7		302.7	312.7	322.7	332.7	342.7	352.7	362.7	372.7	382.7	392.7	402.7	412.7
	v	0.02	7.17	7.29	7.40	7.52	7.63	7.75	7.86	7.97	8.08	8.19	8.30	8.41	8.52
	h	262.1	1177.0	1182.2	1187.3	1192.4	1197.5	1202.6	1207.7	1212.7	1217.7	1222.6	1227.6	1232.5	1237.4
	n	0.4272	1.6432	1.6500	1.6568	1.6634	1.6698	1.6761	1.6823	1.6884	1.6944	1.7003	1.7062	1.7120	1.7177
61	t	293.8		303.8	313.8	323.8	333.8	343.8	353.8	363.8	373.8	383.8	393.8	403.8	413.8
	v	0.02	7.06	7.18	7.29	7.40	7.52	7.63	7.74	7.85	7.95	8.06	8.17	8.28	8.39
	h	263.2	1177.3	1182.5	1187.6	1192.7	1197.8	1202.9	1208.0	1213.0	1218.0	1223.0	1228.0	1232.9	1237.8
	n	0.4287	1.6419	1.6487	1.6555	1.6621	1.6685	1.6748	1.6810	1.6871	1.6931	1.6991	1.7050	1.7107	1.7163
62	t	294.9		304.9	314.9	324.9	334.9	344.9	354.9	364.9	374.9	384.9	394.9	404.9	414.9
	v	0.02	6.95	7.06	7.17	7.29	7.40	7.51	7.62	7.73	7.83	7.94	8.05	8.15	8.26
	h	264.3	1177.6	1182.8	1188.0	1193.2	1198.3	1203.4	1208.4	1213.4	1218.4	1223.4	1228.4	1233.3	1238.2
	n	0.4302	1.6406	1.6474	1.6542	1.6608	1.6673	1.6736	1.6797	1.6858	1.6918	1.6978	1.7037	1.7094	1.7150

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
411.0	421.0	431.0	441.0	451.0	461.0	471.0	481.0	531.0	581.0	631.0	681.0	781.0	881.0	t 50
10.23	10.35	10.48	10.61	10.73	10.86	10.99	11.11	11.74	12.36	12.97	13.58	14.80	16.01	v
1238.1	1242.9	1247.7	1252.5	1257.3	1262.2	1267.0	1271.8	1295.8	1319.7	1343.5	1367.4	1415.1	1463.3	h
1.7382	1.7437	1.7491	1.7545	1.7599	1.7652	1.7704	1.7755	1.8002	1.8237	1.8459	1.8671	1.9072	1.9445	n
412.3	422.3	432.3	442.3	452.3	462.3	472.3	482.3	532.3	582.3	632.3	682.3	782.3	882.3	t 51
10.04	10.16	10.29	10.41	10.54	10.66	10.78	10.91	11.52	12.13	12.73	13.33	14.52	15.71	v
1238.5	1243.3	1248.2	1253.0	1257.8	1262.6	1267.5	1272.4	1296.3	1320.2	1344.0	1367.9	1415.6	1463.8	h
1.7366	1.7421	1.7475	1.7529	1.7583	1.7636	1.7688	1.7739	1.7986	1.8220	1.8442	1.8654	1.9054	1.9427	n
413.5	423.5	433.5	443.5	453.5	463.5	473.5	483.5	533.5	583.5	633.5	683.5	783.5	883.5	t 52
9.86	9.98	10.10	10.22	10.35	10.47	10.59	10.71	11.31	11.91	12.50	13.09	14.26	15.42	v
1239.0	1243.8	1248.6	1253.4	1258.3	1263.1	1268.0	1272.8	1296.7	1320.6	1344.5	1368.4	1416.2	1464.3	h
1.7350	1.7405	1.7459	1.7513	1.7567	1.7619	1.7670	1.7721	1.7969	1.8203	1.8425	1.8636	1.9037	1.9409	n
414.7	424.7	434.7	444.7	454.7	464.7	474.7	484.7	534.7	584.7	634.7	684.7	784.7	884.7	t 53
9.69	9.81	9.93	10 04	10.16	10.28	10.40	10.52	11.11	11.70	12.28	12.86	14.01	15.15	v
1239.4	1244.2	1249.1	1253.9	1258.7	1263.5	1268.4	1273.2	1297.2	1321.1	1345.0	1368.9	1416.7	1464.8	h
1.7335	1.7390	1.7444	1.7498	1.7551	1.7604	1.7656	1.7707	1.7954	1.8187	1.8409	1.8620	1.9020	1.9392	n
415.9	425.9	435.9	445.9	455.9	465.9	475.9	485.9	535.9	585.9	635.9	685.9	785.9	885.9	t 54
9.52	9.64	9.75	9.87	9.99	10.11	10.22	10.34	10.92	11.49	12.06	12.63	13.76	14.88	v
1239.8	1244.7	1249.5	1254.3	1259.2	1264.0	1268.9	1273.7	1297.7	1321.6	1345.5	1369.4	1417.2	1465.3	h
1.7320	1.7375	1.7429	1.7483	1.7536	1.7589	1.7641	1.7692	1.7939	1.8172	1.8393	1.8604	1.9004	1.9375	n
417.1	427.1	437.1	447.1	457.1	467.1	477.1	487.1	537.1	587.1	637.1	687.1	787.1	887.1	t 55
9.36	9.47	9.59	9.70	9.82	9.94	10.05	10.16	10.73	11.30	11.86	12.41	13.52	14.62	v
1240.2	1245.1	1250.0	1254.8	1259.6	1264.5	1269.4	1274.2	1298.1	1322.0	1345.9	1369.8	1417.7	1465.8	h
1.7306	1.7361	1.7415	1.7468	1.7521	1.7574	1.7626	1.7677	1.7924	1.8157	1.8378	1.8589	1.8988	1.9359	n
418.2	428.2	438.2	448.2	458 2	468.2	478.2	488.2	538.2	588.2	638.2	688.2	788.2	888.2	t 56
9.20	9.32	9.43	9.54	9.66	9.77	9.88	9.99	10.55	11.10	11.65	12.20	13.29	14.37	v
1240.7	1245.5	1250.4	1255.2	1260.1	1264.9	1269.8	1274.6	1298.6	1322.5	1346.4	1370.3	1418.2	1466.3	h
1.7291	1.7346	1.7400	1.7453	1.7506	1.7559	1.7611	1.7662	1.7909	1.8141	1.8362	1.8573	1.8972	1.9343	n
419.4	429.4	439.4	449.4	459.4	469.4	479.4	489.4	539.4	589.4	639.4	689.4	789.4	889.4	t 57
9.05	9.16	9.27	9.38	9.50	9.61	9.72	9.83	10.38	10.92	11.46	12.00	13.07	14.13	v
1241.1	1246.0	1250.8	1255.6	1260.5	1265.3	1270.2	1275.1	1299.1	1323.0	1346.9	1370.8	1418.7	1466.7	h
1.7276	1.7331	1.7385	1.7438	1.7491	1.7544	1.7596	1.7647	1.7893	1.8125	1.8346	1.8556	1.8955	1.9326	n
420.5	430.5	440.5	450.5	460.5	470.5	480.5	490.5	540.5	590.5	640.5	690.5	790.5	890.5	t 58
8.90	9.01	9.12	9.23	9.34	9.45	9.56	9.67	10.21	10.74	11.28	11.81	12.86	13.90	v
1241.5	1246.4	1251.2	1256.1	1260.9	1265.8	1270.6	1275.5	1299.5	1323.4	1347.3	1371.2	1419.1	1467.2	h
1.7261	1.7316	1.7370	1.7423	1.7476	1.7529	1.7581	1.7632	1.7878	1.8110	1.8330	1.8540	1.8939	1.9310	n
421.6	431.6	441.6	451.6	461.6	471.6	481.6	491.6	541.6	591.6	641.6	691.6	791.6	891.6	t 59
8.76	8.87	8.98	9.09	9.19	9.30	9.41	9.52	10.05	10.57	11.09	11.61	12.65	13.68	v
1241.9	1246.8	1251.7	1256.5	1261.4	1266.2	1271.1	1276.0	1300.0	1323.9	1347.8	1371.7	1419.6	1467.7	h
1.7247	1.7302	1.7356	1.7409	1.7462	1.7515	1.7567	1.7618	1.7864	1.8095	1.8316	1.8526	1.8924	1.9294	n
422.7	432.7	442.7	452.7	462.7	472.7	482.7	492.7	542.7	592.7	642.7	692.7	792.7	892.7	t 60
8.62	8.73	8.84	8.94	9.05	9.15	9.26	9.36	9.89	10.41	10.92	11.43	12.45	13.46	v
1242.3	1247.2	1252.1	1256.9	1261.8	1266.6	1271.5	1276.4	1300.4	1324.3	1348.3	1372.2	1420.0	1468.2	h
1.7233	1.7288	1.7342	1.7395	1.7448	1.7500	1.7552	1.7603	1.7849	1.8081	1.8301	1.8511	1.8908	1.9279	n
423.8	433.8	443.8	453.8	463.8	473.8	483.8	493.8	543.8	593.8	643.8	693.8	793.8	893.8	t 61
8.50	8.60	8.70	8.80	8.91	9.02	9.12	9.22	9.74	10.25	10.75	11.26	12.26	13.25	v
1242.7	1247.6	1252.5	1257.4	1262.2	1267.0	1271.9	1276.8	1300.8	1324.7	1348.7	1372.6	1420.4	1468.6	h
1.7219	1.7274	1.7328	1.7382	1.7435	1.7487	1.7539	1.7590	1.7836	1.8067	1.8287	1.8497	1.8894	1.9265	n
424.9	434.9	444.9	454.9	464.9	474.9	484.9	494.9	544.9	594.9	644.9	694.9	794.9	894.9	t 62
8.36	8.46	8.57	8.67	8.77	8.88	8.98	9.08	9.59	10.09	10.59	11.09	12.07	13.05	v
1243.1	1248.0	1252.9	1257.7	1262.6	1267.4	1272.3	1277.2	1301.2	1325.1	1349.1	1373.0	1420.8	1469.1	h
1.7206	1.7261	1.7315	1.7369	1.7422	1.7474	1.7526	1.7577	1.7823	1.8054	1.8273	1.8483	1.8880	1.9250	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
63	t	295.9		305.9	315.9	325.9	335.9	345.9	355.9	365.9	375.9	385.9	395.9	405.9	415.9
	v	0.02	6.85	6.96	7.07	7.18	7.29	7.40	7.51	7.61	7.72	7.82	7.93	8.03	8.14
	h	265.4	1177.9	1183.1	1188.3	1193.5	1198.6	1203.7	1208.8	1213.8	1218.8	1223.7	1228.7	1233.7	1238.6
	n	0.4316	1.6393	1.6461	1.6529	1.6595	1.6659	1.6722	1.6784	1.6845	1.6905	1.6965	1.7024	1.7081	1.7137
64	t	297.0		307.0	317.0	327.0	337.0	347.0	357.0	367.0	377.0	387.0	397.0	407.0	417.0
	v	0.02	6.75	6.86	6.97	7.08	7.19	7.29	7.40	7.50	7.60	7.71	7.81	7.91	8.02
	h	266.4	1178.2	1183.4	1188.6	1193.8	1198.9	1204.0	1209.1	1214.1	1219.1	1224.1	1229.1	1234.1	1239.0
	n	0.4330	1.6380	1.6448	1.6516	1.6582	1.6646	1.6709	1.6771	1.6832	1.6892	1.6952	1.7011	1.7068	1.7124
65	t	298.0		308.0	318.0	328.0	338.0	348.0	358.0	368.0	378.0	388.0	398.0	408.0	418.0
	v	0.02	6.65	6.76	6.87	6.98	7.09	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90
	h	667.5	1178.5	1183.7	1188.9	1194.1	1199.2	1204.4	1209.5	1214.5	1219.5	1224.5	1229.5	1234.4	1239.3
	n	0.4344	1.6368	1.6436	1.6504	1.6570	1.6635	1.6698	1.6760	1.6821	1.6881	1.6940	1.6999	1.7056	1.7112
66	t	299.0		309.0	319.0	329.0	339.0	349.0	359.0	369.0	379.0	389.0	399.0	409.0	419.0
	v	0.02	6.56	6.66	6.77	6.88	6.98	7.09	7.19	7.29	7.39	7.49	7.59	7.69	7.79
	h	268.5	1178.8	1184.0	1189.2	1194.4	1199.5	1204.7	1209.8	1214.8	1219.8	1224.8	1229.8	1234.8	1239.7
	n	0.4358	1.6355	1.6423	1.6491	1.6557	1.6622	1.6685	1.6747	1.6808	1.6868	1.6927	1.6986	1.7043	1.7099
67	t	300.0		310.0	320.0	330.0	340.0	350.0	360.0	370.0	380.0	390.0	400.0	410.0	420.0
	v	0.02	6.47	6.58	6.68	6.78	6.89	6.99	7.09	7.19	7.29	7.39	7.49	7.58	7.68
	h	269.6	1179.0	1184.3	1189.5	1194.7	1199.9	1205.0	1210.1	1215.1	1220.2	1225.2	1230.2	1235.2	1240.1
	n	0.4371	1.6343	1.6411	1.6479	1.6545	1.6610	1.6673	1.6735	1.6796	1.6856	1.6915	1.6974	1.7031	1.7087
68	t	301.0		311.0	321.0	331.0	341.0	351.0	361.0	371.0	381.0	391.0	401.0	411.0	421.0
	v	0.02	6.38	6.48	6.58	6.69	6.79	6.89	6.99	7.09	7.19	7.29	7.38	7.48	7.57
	h	270.6	1179.3	1184.6	1189.8	1195.0	1200.2	1205.3	1210.4	1215.5	1220.5	1225.5	1230.5	1235.5	1240.4
	n	0.4385	1.6331	1.6399	1.6467	1.6534	1.6598	1.6661	1.6723	1.6784	1.6844	1.6903	1.6961	1.7019	1.7075
69	t	302.0		312.0	322.0	332.0	342.0	352.0	362.0	372.0	382.0	392.0	402.0	412.0	422.0
	v	0.02	6.29	6.39	6.49	6.60	6.70	6.80	6.90	6.99	7.09	7.19	7.28	7.38	7.47
	h	271.6	1179.6	1184.9	1190.1	1195.3	1200.5	1205.6	1210.7	1215.8	1220.8	1225.8	1230.8	1235.8	1240.7
	n	0.4398	1.6319	1.6387	1.6455	1.6521	1.6586	1.6649	1.6711	1.6772	1.6832	1.6892	1.6950	1.7007	1.7063
70	t	302.9		312.9	322.9	332.9	342.9	352.9	362.9	372.9	382.9	392.9	402.9	412.9	422.9
	v	0.02	6.20	6.30	6.40	6.51	6.61	6.71	6.81	6.90	7.00	7.09	7.18	7.28	7.37
	h	272.6	1179.8	1185.1	1190.4	1195.6	1200.8	1205.9	1211.0	1216.1	1221.2	1226.2	1231.2	1236.2	1241.1
	n	0.4411	1.6307	1.6376	1.6444	1.6510	1.6574	1.6637	1.6699	1.6760	1.6820	1.6880	1.6939	1.6996	1.7052
71	t	303.9		313.9	323.9	333.9	343.9	353.9	363.9	373.9	383.9	393.9	403.9	413.9	423.9
	v	0.02	6.12	6.22	6.32	6.42	6.52	6.62	6.72	6.81	6.90	7.00	7.09	7.18	7.27
	h	273.6	1180.1	1185.4	1190.7	1195.9	1201.1	1206.3	1211.4	1216.4	1221.5	1226.5	1231.5	1236.5	1241.4
	n	0.4424	1.6296	1.6365	1.6433	1.6499	1.6563	1.6627	1.6689	1.6750	1.6810	1.6869	1.6928	1.6985	1.7041
72	t	304.8		314.8	324.8	334.8	344.8	354.8	364.8	374.8	384.8	394.8	404.8	414.8	424.8
	v	0.02	6.04	6.14	6.24	6.34	6.44	6.54	6.63	6.72	6.81	6.90	6.99	7.08	7.17
	h	274.5	1180.4	1185.7	1191.0	1196.2	1201.4	1206.6	1211.7	1216.8	1221.8	1226.8	1231.8	1236.8	1241.7
	n	0.4437	1.6285	1.6354	1.6422	1.6488	1.6553	1.6616	1.6678	1.6739	1.6799	1.6858	1.6917	1.6974	1.7030
73	t	305.8		315.8	325.8	335.8	345.8	355.8	365.8	375.8	385.8	395.8	405.8	415.8	425.8
	v	0.02	5.96	6.06	6.15	6.25	6.35	6.45	6.54	6.63	6.73	6.82	6.91	7.00	7.09
	h	275.5	1180.6	1185.9	1191.2	1196.5	1201.7	1206.9	1212.0	1217.1	1222.1	1227.1	1232.1	1237.1	1242.0
	n	0.4449	1.6274	1.6343	1.6411	1.6478	1.6543	1.6606	1.6667	1.6728	1.6788	1.6847	1.6906	1.6963	1.7019
74	t	306.7		316.7	326.7	336.7	346.7	356.7	366.7	376.7	386.7	396.7	406.7	416.7	426.7
	v	0.02	5.89	5.98	6.07	6.17	6.27	6.36	6.46	6.55	6.64	6.73	6.82	6.91	7.00
	h	276.5	1180.9	1186.2	1191.5	1196.8	1202.0	1207.2	1212.3	1217.4	1222.4	1227.5	1232.5	1237.5	1242.4
	n	0.4462	1.6263	1.6332	1.6400	1.6467	1.6532	1.6595	1.6656	1.6717	1.6777	1.6837	1.6895	1.6952	1.7008

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = 1.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
425.9	435.9	445.9	455.9	465.9	475.9	485.9	495.9	545.9	595.9	645.9	695.9	795.9	895.9	t 63
8.24	8.34	8.44	8.54	8.64	8.74	8.84	8.94	9.44	9.94	10.43	10.92	11.89	12.85	v
1243.5	1248.4	1253.3	1258.1	1263.0	1267.8	1272.7	1277.6	1301.6	1325.5	1349.5	1373.5	1421.2	1469.5	h
1.7193	1.7248	1.7302	1.7356	1.7409	1.7461	1.7513	1.7564	1.7809	1.8040	1.8260	1.8469	1.8866	1.9236	n
427.0	437.0	447.0	457.0	467.0	477.0	487.0	497.0	547.0	597.0	647.0	697.0	797.0	897.0	t 64
8.12	8.22	8.32	8.42	8.52	8.62	8.72	8.81	9.31	9.80	10.28	10.76	11.71	12.66	v
1243.9	1248.7	1253.6	1258.5	1263.3	1268.2	1273.1	1278.0	1302.0	1326.0	1350.0	1373.9	1421.7	1469.9	h
1.7180	1.7235	1.7290	1.7343	1.7396	1.7448	1.7500	1.7551	1.7796	1.8027	1.8246	1.8455	1.8852	1.9222	n
428.0	438.0	448.0	458.0	468.0	478.0	488.0	498.0	548.0	598.0	648.0	698.0	798.0	898.0	t 65
8.00	8.10	8.20	8.29	8.39	8.49	8.59	8.69	9.17	9.65	10.12	10.60	11.54	12.48	v
1244.2	1249.1	1254.0	1258.8	1263.7	1268.6	1273.5	1278.4	1302.4	1326.4	1350.4	1374.3	1422.1	1470.3	h
1.7168	1.7223	1.7277	1.7331	1.7384	1.7436	1.7488	1.7539	1.7784	1.8014	1.8233	1.8442	1.8839	1.9208	n
429.0	439.0	449.0	459.0	469.0	479.0	489.0	499.0	549.0	599.0	649.0	699.0	799.0	899.0	t 66
7.89	7.98	8.08	8.18	8.28	8.37	8.47	8.56	9.04	9.51	9.98	10.45	11.38	12.30	v
1244.6	1249.5	1254.4	1259.2	1264.1	1269.0	1273.9	1278.8	1302.8	1326.8	1350.8	1374.8	1422.6	1470.8	h
1.7155	1.7210	1.7264	1.7318	1.7371	1.7423	1.7474	1.7525	1.7771	1.8001	1.8220	1.8429	1.8825	1.9194	n
430.0	440.0	450.0	460.0	470.0	480.0	490.0	500.0	550.0	600.0	650.0	700.0	800.0	900.0	t 67
7.78	7.88	7.97	8.07	8.16	8.26	8.35	8.45	8.92	9.38	9.84	10.30	11.22	12.13	v
1245.0	1249.9	1254.8	1259.6	1264.5	1269.3	1274.2	1279.1	1303.2	1327.2	1351.1	1375.1	1423.0	1471.2	h
1.7143	1.7198	1.7252	1.7306	1.7359	1.7411	1.7462	1.7513	1.7758	1.7988	1.8207	1.8416	1.8812	1.9181	n
431.0	441.0	451.0	461.0	471.0	481.0	491.0	501.0	551.0	601.0	651.0	701.0	801.0	901.0	t 68
7.67	7.77	7.86	7.96	8.05	8.14	8.23	8.33	8.79	9.25	9.70	10.15	11.06	11.96	v
1245.3	1250.2	1255.1	1260.0	1264.8	1269.7	1274.6	1279.5	1303.5	1327.5	1351.5	1375.5	1423.4	1471.6	h
1.7131	1.7186	1.7240	1.7294	1.7347	1.7399	1.7450	1.7501	1.7746	1.7976	1.8195	1.8403	1.8799	1.9168	n
432.0	442.0	452.0	462.0	472.0	482.0	492.0	502.0	552.0	602.0	652.0	702.0	802.0	902.0	t 69
7.56	7.66	7.75	7.85	7.94	8.03	8.12	8.22	8.67	9.12	9.57	10.02	10.91	11.79	v
1245.6	1250.5	1255.4	1260.3	1265.2	1270.1	1275.0	1279.9	1303.9	1327.9	1351.9	1375.9	1423.8	1472.0	h
1.7119	1.7174	1.7228	1.7282	1.7335	1.7387	1.7438	1.7489	1.7733	1.7963	1.8182	1.8390	1.8786	1.9155	n
432.9	442.9	452.9	462.9	472.9	482.9	492.9	502.9	552.9	602.9	652.9	702.9	802.9	902.9	t 70
7.46	7.56	7.65	7.74	7.83	7.92	8.02	8.11	8.56	9.01	9.45	9.89	10.76	11.63	v
1246.0	1250.9	1255.8	1260.7	1265.5	1270.4	1275.3	1280.2	1304.3	1328.3	1352.2	1376.2	1424.2	1472.4	h
1.7107	1.7162	1.7216	1.7270	1.7323	1.7375	1.7426	1.7477	1.7721	1.7951	1.8170	1.8378	1.8773	1.9141	n
433.9	443.9	453.9	463.9	473.9	483.9	493.9	503.9	553.9	603.9	653.9	703.9	803.9	903.9	t 71
7.36	7.46	7.55	7.64	7.73	7.82	7.91	8.00	8.44	8.88	9.32	9.76	10.62	11.48	v
1246.3	1251.2	1256.1	1261.0	1265.9	1270.8	1275.7	1280.6	1304.7	1328.7	1352.6	1376.6	1424.6	1472.8	h
1.7097	1.7152	1.7206	1.7259	1.7312	1.7364	1.7415	1.7466	1.7710	1.7939	1.8158	1.8366	1.8761	1.9129	n
434.8	444.8	454.8	464.8	474.8	484.8	494.8	504.8	554.8	604.8	654.8	704.8	804.8	904.8	t 72
7.25	7.34	7.43	7.52	7.61	7.70	7.79	7.88	8.31	8.74	9.16	9.58	10.42	11.26	v
1246.7	1251.6	1256.5	1261.4	1266.3	1271.2	1276.1	1281.0	1305.0	1329.0	1353.0	1377.0	1425.0	1473.2	h
1.7086	1.7141	1.7195	1.7248	1.7301	1.7353	1.7404	1.7454	1.7699	1.7928	1.8147	1.8354	1.8749	1.9117	n
435.8	445.8	455.8	465.8	475.8	485.8	495.8	505.8	555.8	605.8	655.8	705.8	805.8	905.8	t 73
7.18	7.27	7.36	7.45	7.54	7.63	7.71	7.80	8.23	8.66	9.08	9.50	103.4	11.18	v
1247.0	1251.9	1256.8	1261.7	1266.6	1271.5	1276.4	1281.3	1305.4	1329.4	1353.3	1377.3	1425.3	1473.6	h
1.7075	1.7130	1.7184	1.7237	1.7290	1.7342	1.7393	1.7443	1.7688	1.7917	1.8135	1.8343	1.8738	1.9105	n
436.7	446.7	456.7	466.7	476.7	486.7	496.7	506.7	556.7	606.7	656.7	706.7	806.7	906.7	t 74
7.08	7.17	7.26	7.35	7.44	7.52	7.61	7.70	8.13	8.55	8.97	9.38	10.20	11.04	v
1247.3	1252.2	1257.1	1262.0	1266.9	1271.8	1276.7	1281.6	1305.8	1329.8	1353.7	1377.7	1425.7	1474.0	h
1.7064	1.7119	1.7173	1.7226	1.7279	1.7331	1.7382	1.7432	1.7676	1.7905	1.8124	1.8331	1.8726	1.9093	n

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
75	t	307.6		317.6	327.6	337.6	347.6	357.6	367.6	377.6	387.6	397.6	407.6	417.6	427.6
	v	0.02	5.81	5.91	6.00	6.10	6.19	6.28	6.37	6.46	6.55	6.64	6.73	6.82	6.91
	h	277.4	1181.1	1186.5	1191.8	1197.1	1202.3	1207.5	1212.6	1217.7	1222.8	1227.8	1232.8	1237.7	1242.7
	n	0.4474	1.6252	1.6321	1.6389	1.6456	1.6521	1.6584	1.6645	1.6706	1.6767	1.6825	1.6883	1.6941	1.6998
76	t	308.5		318.5	328.5	338.5	348.5	358.5	368.5	378.5	388.5	398.5	408.5	418.5	428.5
	v	0.02	5.74	5.83	5.92	6.02	6.12	6.21	6.30	6.39	6.48	6.56	6.65	6.74	6.82
	h	278.3	1181.4	1186.7	1192.0	1197.3	1202.6	1207.8	1212.9	1218.0	1223.0	1228.1	1233.1	1238.1	1243.0
	n	0.4487	1.6242	1.6310	1.6378	1.6445	1.6509	1.6572	1.6634	1.6695	1.6756	1.6815	1.6873	1.6930	1.6986
77	t	309.4		319.4	329.4	339.4	349.4	359.4	369.4	379.4	389.4	399.4	409.4	419.4	429.4
	v	0.02	5.67	5.76	5.85	5.95	6.04	6.13	6.22	6.31	6.40	6.49	6.57	6.65	6.74
	h	279.3	1181.6	1186.9	1192.2	1197.5	1202.8	1208.0	1213.1	1218.3	1223.4	1228.4	1233.4	1238.4	1243.3
	n	0.4499	1.6231	1.6300	1.6368	1.6435	1.6499	1.6562	1.6624	1.6685	1.6746	1.6805	1.6863	1.6920	1.6977
78	t	310.3		320.3	330.3	340.3	350.3	360.3	370.3	380.3	390.3	400.3	410.3	420.3	430.3
	v	0.02	5.60	5.69	5.78	5.87	5.97	6.06	6.15	6.24	6.32	6.41	6.49	6.57	6.66
	h	280.2	1181.8	1187.2	1192.6	1197.9	1203.1	1208.3	1213.4	1218.5	1223.6	1228.7	1233.7	1238.7	1243.6
	n	0.4511	1.6221	1.6290	1.6358	1.6425	1.6490	1.6553	1.6615	1.6676	1.6736	1.6795	1.6854	1.6911	1.6967
79	t	311.2		321.2	331.2	341.2	351.2	361.2	371.2	381.2	391.2	401.2	411.2	421.2	431.2
	v	0.02	5.54	5.63	5.72	5.81	5.90	5.99	6.07	6.16	6.25	6.33	6.41	6.49	6.58
	h	281.1	1182.1	1187.5	1192.8	1198.1	1203.4	1208 6	1213.7	1218.8	1223.9	1229.0	1234.0	1239.0	1243.9
	n	0.4523	1.6210	1.6279	1.6347	1.6414	1.6479	1.6542	1.6604	1.6665	1.6726	1.6785	1.6843	1.6900	1.6956
80	t	312.0		322.0	332.0	342.0	352.0	362.0	372.0	382.0	392.0	402.0	412.0	422.0	432.0
	v	0.02	5.47	5.56	5.65	5.74	5.83	5.92	6.00	6.09	6.18	6.26	6.34	6.42	6.50
	h	282.0	1182.3	1187.7	1193.0	1198.3	1203 6	1208.8	1214.0	1219.1	1224.2	1229.3	1234.3	1239.3	1244.2
	n	0.4535	1.6200	1.6270	1.6338	1.6404	1.6469	1.6532	1.6594	1.6655	1.6716	1.6775	1.6833	1.6890	1.6946
81	t	312.9		322.9	332.9	342.9	352.9	362.9	372.9	382.9	392.9	402.9	412.9	422.9	432.9
	v	0.02	5.41	5.50	5.58	5.67	5.76	5.85	5.94	6.03	6.11	6.19	6.27	6.35	6.43
	h	282.9	1182.5	1187.9	1193.3	1198 6	1203.9	1209.1	1214.3	1219.4	1224.5	1229.6	1234.6	1239.6	1244.5
	n	0.4546	1.6190	1.6260	1.6328	1.6394	1.6459	1.6523	1.6585	1.6646	1.6706	1.6765	1.6823	1.6880	1.6936
82	t	313.8		323.8	333.8	343.8	353.8	363 8	373.8	383.8	393.8	403.8	413.8	423.8	433.8
	v	0.02	5.34	5.43	5.52	5.61	5.70	5.78	5.86	5.95	6 03	6.11	6.19	6.27	6.35
	h	283.8	1182.8	1188.2	1193.6	1198.9	1204.2	1209.4	1214.6	1219.7	1224.8	1229.9	1235.0	1240.0	1244.9
	n	0.4557	1.6180	1.6250	1.6318	1.6385	1.6450	1.6513	1.6575	1.6636	1.6696	1.6755	1.6813	1.6870	1.6926
83	t	314.6		324.6	334.6	344.6	354.6	364.6	374.6	384.6	394.6	404.6	414.6	424.6	434.6
	v	0.02	5.28	5.37	5.45	5.54	5.63	5.72	5.80	5.88	5.96	6.04	6.12	6.20	6.28
	h	284.6	1183.0	1188.4	1193.8	1199.1	1204.4	1209.7	1214.9	1220.0	1225.1	1230.1	1235.2	1240.2	1245.2
	n	0.4568	1.6170	1.6240	1.6308	1.6375	1.6440	1.6503	1.6565	1.6626	1.6686	1.6746	1.6804	1.6860	1.6916
84	t	315.4		325.4	335.4	345.4	355.4	365.4	375.4	385.4	395.4	405.4	415.4	425.4	435.4
	v	0.02	5.22	5.31	5.39	5.48	5.57	5.65	5.73	5.82	5.90	5.98	6.05	6.13	6.21
	h	285.5	1183.2	1188.6	1194.0	1199.4	1204.7	1209.9	1215.1	1220.3	1225.4	1230.4	1235.5	1240.5	1245.4
	n	0.4579	1.6160	1.6230	1.6298	1.6365	1.6430	1.6493	1.6555	1.6616	1.6677	1.6736	1.6794	1.6851	1.6907
85	t	316.3		326.3	336.3	346.3	356.3	366.3	376.3	386.3	396.3	406.3	416.3	426.3	436.3
	v	0.02	5.16	5.25	5.33	5.42	5.51	5.59	5.67	5.75	5.83	5.91	5.99	6.06	6.14
	h	286.3	1183.4	1188.9	1194.3	1199.6	1204.9	1210.2	1215.4	1220.6	1225.7	1230.7	1235.8	1240.8	1245.8
	n	0.4590	1.6151	1.6221	1.6290	1.6356	1.6421	1.6485	1.6547	1.6608	1.6668	1.6727	1.6785	1.6842	1.6898
86	t	317.1		327.1	337.1	347.1	357.1	367.1	377.1	387.1	397.1	407.1	417.1	427.1	437.1
	v	0.02	5.10	5.19	5.27	5.36	5.45	5.53	5.61	5.69	5.77	5.85	5.92	6.00	6.07
	h	287.2	1183.6	1189.1	1194.5	1199.9	1205.2	1210.4	1215.6	1220.8	1225.9	1231.0	1236.1	1241.1	1246.0
	n	0.4601	1.6141	1.6211	1.6280	1.6346	1.6411	1.6475	1.6537	1.6598	1.6658	1.6717	1.6775	1.6832	1.6888
87	t	317.9		327.9	337.9	347.9	357.9	367.9	377.9	387.9	397.9	407.9	417.9	427.9	437.9
	v	0.02	5.05	5.14	5.22	5.30	5.39	5.47	5.55	5.63	5.71	5.78	5.86	5.93	6.01
	h	288.0	1183.8	1189.3	1194.7	1200.1	1205.4	1210.7	1215.9	1221.1	1226.2	1231.3	1236.4	1241.4	1246.3
	n	0.4612	1.6132	1.6202	1.6271	1.6338	1.6403	1.6466	1.6528	1.6589	1.6649	1.6708	1.6766	1.6823	1.6879

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
437.6	447.6	457.6	467.6	477.6	487.6	497.6	507.6	557.6	607.6	657.6	707.6	807.6	907.6	t 75
7.00	7.09	7.17	7.26	7.34	7.43	7.51	7.60	8.02	8.44	8.86	9.27	10.08	10.90	v
1247.7	1252.6	1257.5	1262.4	1267.3	1272.2	1276.9	1282.0	1306.1	1330.1	1354.1	1378.0	1426.1	1474.4	h
1.7054	1.7108	1.7162	1.7215	1.7267	1.7319	1.7370	1.7421	1.7665	1.7894	1.8112	1.8320	1.8714	1.9081	n
438.5	448.5	458.5	468.5	478.5	488.5	498.5	508.5	558.5	608.5	658.5	708.5	808.5	908.5	t 76
6.91	7.00	7.08	7.17	7.25	7.34	7.42	7.51	7.93	8.34	8.75	9.15	9.96	10.76	v
1248.0	1252.9	1257.8	1262.7	1267.6	1272.5	1277.4	1282.3	1306.4	1330.5	1354.5	1378.4	1426.5	1474.8	h
1.7042	1.7097	1.7151	1.7204	1.7256	1.7308	1.7359	1.7410	1.7654	1.7883	1.8101	1.8308	1.8702	1.9069	n
439.4	449.4	459.4	469.4	479.4	489.4	499.4	509.4	559.4	609.4	659.4	709.4	809.4	909.4	t 77
6.82	6.91	7.00	7.08	7.16	7.25	7.33	7.42	7.83	8.24	8.64	9.04	9.84	10.63	v
1248.3	1253.2	1258.1	1263.0	1267.9	1272.8	1277.7	1282.6	1306.7	1330.8	1354.8	1378.7	1426.8	1475.1	h
1.7033	1.7087	1.7141	1.7194	1.7246	1.7298	1.7349	1.7400	1.7643	1.7872	1.8090	1.8298	1.8691	1.9058	n
440.3	450.3	460.3	470.3	480.3	490.3	500.3	510.3	560.3	610.3	660.3	710.3	810.3	910.3	t 78
6.74	6.83	6.92	7.00	7.08	7.16	7.24	7.33	7.74	8.14	8.54	8.93	9.72	10.50	v
1248.6	1253.5	1258.4	1263.3	1268.2	1273.1	1278.0	1283.0	1307.1	1331.2	1355.2	1379.1	1427.2	1475.5	h
1.7023	1.7077	1.7131	1.7184	1.7236	1.7288	1.7339	1.7389	1.7633	1.7862	1.8080	1.8287	1.8681	1.9047	n
441.2	451.2	461.2	471.2	481.2	491.2	501.2	511.2	561.2	611.2	661.2	711.2	811.2	911.2	t 79
6.66	6.95	6.83	6.91	6.99	7.08	7.16	7.24	7.64	8.04	8.43	8.82	9.60	10.37	v
1248.9	1253.8	1258.7	1263.7	1268.6	1273.5	1278.4	1283.3	1307.4	1331.5	1355.5	1379.4	1427.5	1475.8	h
1.7012	1.7066	1.7120	1.7173	1.7225	1.7277	1.7328	1.7378	1.7622	1.7851	1.8068	1.8276	1.8669	1.9036	n
442.0	452.0	462.0	472.0	482.0	492.0	502.0	512.0	562.0	612.0	662.0	712.0	812.0	912.0	t 80
6.58	6.67	6.75	6.83	6.91	7.00	7.08	7.17	7.56	7.95	8.34	8.72	9.49	10.24	v
1249.2	1254.1	1259.0	1264.0	1268.9	1273.8	1278.7	1283.6	1307.8	1331.9	1355.9	1379.8	1427.9	1476.2	h
1.7001	1.7056	1.7110	1.7163	1.7215	1.7267	1.7318	1.7368	1.7612	1.7840	1.8058	1.8265	1.8658	1.9025	n
442.9	452.9	462.9	472.9	482.9	492.9	502.9	512.9	562.9	612.9	662.9	712.9	812.9	912.9	t 81
6.51	6.60	6.68	6.76	6.84	6.92	7.00	7.08	7.47	7.86	8.25	8.63	9.39	10.13	v
1249.5	1254.4	1259.4	1264.3	1269.2	1274.1	1279.0	1283.9	1308.1	1332.2	1356.2	1380.1	1428.3	1476.6	h
1.6991	1.7046	1.7100	1.7153	1.7205	1.7257	1.7308	1.7358	1.7602	1.7830	1.8048	1.8255	1.8648	1.9014	n
443.8	453.8	463.8	473.8	483.8	493.8	503.8	513.8	563.8	613.8	663.8	713.8	813.8	913.8	t 82
6.43	6.52	6.60	6.68	6.76	6.84	6.92	7.00	7.39	7.77	8.15	8.52	9.27	10.01	v
1249.9	1254.8	1259.7	1264.6	1269.5	1274.4	1279.3	1284.2	1308.4	1332.5	1356.5	1380.5	1428.6	1476.9	h
1.6981	1.7036	1.7090	1.7143	1.7195	1.7247	1.7298	1.7348	1.7591	1.7820	1.8037	1.8244	1.8637	1.9003	n
444.6	454.6	464.6	474.6	484.6	494.6	504.6	514.6	564.6	614.6	664.6	714.6	814.6	914.6	t 83
6.36	6.44	6.52	6.60	6.68	6.76	6.84	6.92	7.30	7.68	8.05	8.42	9.17	9.90	v
1250.2	1255.1	1260.0	1264.9	1269.8	1274.7	1279.7	1284.6	1308.8	1332.9	1356.9	1380.8	1428.9	1477.2	h
1.6971	1.7026	1.7080	1.7133	1.7185	1.7237	1.7288	1.7338	1.7581	1.7810	1.8027	1.8234	1.8626	1.8992	n
445.4	455.4	465.4	475.4	485.4	495.4	505.4	515.4	565.4	615.4	665.4	715.4	815.4	915.4	t 84
6.29	6.37	6.45	6.53	6.61	6.69	6.76	6.84	7.22	7.60	7.97	8.33	9.06	9.79	v
1250.4	1255.3	1260.3	1265.2	1270.1	1275.0	1279.9	1284.9	1309.1	1333.2	1357.2	1381.2	1429.3	1477.6	h
1.6963	1.7017	1.7070	1.7123	1.7175	1.7227	1.7278	1.7328	1.7571	1.7799	1.8017	1.8224	1.8616	1.8981	n
446.3	456.3	466.3	476.3	486.3	496.3	506.3	516.3	566.3	616.3	666.3	716.3	816.3	916.3	t 85
6.22	6.30	6.38	6.45	6.53	6.61	6.69	6.76	7.14	7.51	7.88	8.24	8.96	9.68	v
1250.8	1255.7	1260.6	1265.5	1270.4	1275.3	1280.3	1285.2	1309.4	1333.5	1357.5	1381.5	1429.6	1477.9	h
1.6954	1.7008	1.7061	1.7114	1.7166	1.7218	1.7269	1.7319	1.7562	1.7790	1.8007	1.8214	1.8606	1.8971	n
447.1	457.1	467.1	477.1	487.1	497.1	507.1	517.1	567.1	617.1	667.1	717.1	817.1	917.1	t 86
6.15	6.23	6.31	6.38	6.46	6.54	6.62	6.69	7.06	7.43	7.79	8.15	8.86	9.57	v
1251.0	1255.9	1260.8	1265.8	1270.7	1275.6	1280.6	1285.5	1309.7	1333.8	1357.8	1381.8	1429.9	1478.2	h
1.6943	1.6998	1.7052	1.7105	1.7157	1.7208	1.7259	1.7309	1.7551	1.7780	1.7997	1.8204	1.8596	1.8961	n
447.9	457.9	467.9	477.9	487.9	497.9	507.9	517.9	567.9	617.9	667.9	717.9	817.9	917.9	t 87
6.09	6.16	6.24	6.32	6.40	6.48	6.56	6.63	7.00	7.37	7.73	8.09	8.81	9.52	v
1251.3	1256.2	1261.1	1266.1	1271.0	1275.9	1280.9	1285.8	1310.0	1334.1	1358.1	1382.1	1430.2	1478.5	h
1.6934	1.6989	1.7043	1.7095	1.7147	1.7199	1.7250	1.7300	1.7542	1.7770	1.7988	1.8194	1.8586	1.8951	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
88	t	318.7		328.7	338.7	348.7	358.7	368.7	378.7	388.7	398.7	408.7	418.7	428.7	438.7
	v	0.02	5.00	5.08	5.16	5.24	5.33	5.41	5.49	5.57	5.65	5.72	5.80	5.87	5.95
	h	288.9	1184.0	1189.5	1195.0	1200.4	1205.7	1211.0	1216.2	1221.4	1226.5	1231.5	1236.6	1241.6	1246.6
	n	0.4623	1.6123	1.6193	1.6262	1.6329	1.6394	1.6457	1.6519	1.6580	1.6641	1.6700	1.6758	1.6815	1.6871
89	t	319.5		329.5	339.5	349.5	359.5	369.5	379.5	389.5	399.5	409.5	419.5	429.5	439.5
	v	0.02	4.94	5.02	5.10	5.19	5.27	5.35	5.43	5.51	5.59	5.66	5.74	5.81	5.88
	h	289.7	1184.2	1189.8	1195.2	1200.6	1205.9	1211.2	1216.4	1221.6	1226.7	1231.8	1236.9	1241.9	1246.9
	n	0.4633	1.6114	1.6184	1.6253	1.6320	1.6385	1.6448	1.6510	1.6572	1.6632	1.6691	1.6749	1.6806	1.6862
90	t	320.3		330.3	340.3	350.3	360.3	370.3	380.3	390.3	400.3	410.3	420.3	430.3	440.3
	v	0.02	4.89	4.97	5.05	5.13	5.21	5.29	5.37	5.44	5.52	5.60	5.67	5.74	5.82
	h	290.5	1184.4	1190.0	1195.4	1200.8	1206.1	1211.4	1216.7	1221.9	1227.0	1232.1	1237.2	1242.2	1247.2
	n	0.4644	1.6105	1.6175	1.6244	1.6311	1.6376	1.6440	1.6502	1.6563	1.6623	1.6682	1.6740	1.6797	1.6853
91	t	321.1		331.1	341.1	351.1	361.1	371.1	381.1	391.1	401.1	411.1	421.1	431.1	441.1
	v	0.02	4.84	4.92	5.00	5.08	5.16	5.24	5.31	5.39	5.47	5.54	5.61	5.69	5.76
	h	291.3	1184.6	1190.2	1195.7	1201.1	1206.4	1211.7	1216.9	1222.1	1227.2	1232.3	1237.4	1242.4	1247.4
	n	0.4654	1.6096	1.6166	1.6235	1.6302	1.6367	1.6431	1.6493	1.6554	1.6615	1.6674	1.6732	1.6788	1.6844
92	t	321.8		331.8	341.8	351.8	361.8	371.8	381.8	391.8	401.8	411.8	421.8	431.8	441.8
	v	0.02	4.79	4.87	4.95	5.03	5.11	5.19	5.26	5.33	5.41	5.48	5.56	5.63	5.70
	h	292.1	1184.8	1190.4	1195.9	1201.3	1206.6	1211.9	1217.2	1222.4	1227.5	1232.6	1237.7	1242.7	1247.7
	n	0.4664	1.6087	1.6157	1.6226	1.6293	1.6359	1.6423	1.6485	1.6546	1.6606	1.6665	1.6723	1.6780	1.6836
93	t	322.6		332.6	342.6	352.6	362.6	372.6	382.6	392.6	402.6	412.6	422.6	432.6	442.6
	v	0.02	4.74	4.82	4.90	4.98	5.06	5.14	5.21	5.28	5.36	5.43	5.50	5.57	5.64
	h	292.9	1185.0	1190.6	1196.1	1201.5	1206.8	1212.1	1217.4	1222.6	1227.8	1232.9	1238.0	1243.0	1248.0
	n	0.4674	1.6078	1.6148	1.6217	1.6284	1.6350	1.6414	1.6476	1.6537	1.6597	1.6656	1.6714	1.6771	1.6827
94	t	323.4		333.4	343.4	353.4	363.4	373.4	383.4	393.4	403.4	413.4	423.4	433.4	443.4
	v	0.02	4.69	4.77	4.85	4.93	5.01	5.09	5.16	5.23	5.30	5.37	5.45	5.52	5.59
	h	293.7	1185.2	1190.8	1196.3	1201.7	1207.1	1212.4	1217.6	1222.9	1228.0	1233.1	1238.2	1243.2	1248.2
	n	0.4684	1.6069	1.6139	1.6208	1.6276	1.6341	1.6405	1.6467	1.6528	1.6588	1.6647	1.6705	1.6762	1.6818
95	t	324.1		334.1	344.1	354.1	364.1	374.1	384.1	394.1	404.1	414.1	424.1	434.1	444.1
	v	0.02	4.65	4.73	4.80	4.88	4.96	5.03	5.10	5.18	5.25	5.32	5.39	5.46	5.53
	h	294.5	1185.4	1191.0	1196.5	1201.9	1207.3	1212.6	1217.9	1223.1	1228.2	1233.3	1238.4	1243.5	1248.5
	n	0.4694	1.6061	1.6131	1.6200	1.6268	1.6333	1.6397	1.6459	1.6520	1.6581	1.6640	1.6697	1.6754	1.6810
96	t	324.9		334.9	344.9	354.9	364.9	374.9	384.9	394.9	404.9	414.9	424.9	434.9	444.9
	v	0.02	4.60	4.68	4.75	4.83	4.91	4.98	5.05	5.12	5.20	5.27	5.34	5.41	5.48
	h	295.3	1185.6	1191.2	1196.7	1202.1	1207.5	1212.8	1218.1	1223.3	1228.5	1233.6	1238.7	1243.7	1248.7
	n	0.4704	1.6052	1.6122	1.6191	1.6258	1.6324	1.6388	1.6451	1.6512	1.6572	1.6631	1.6689	1.6745	1.6801
97	t	325.6		335.6	345.6	355.6	365.6	375.6	385.6	395.6	405.6	415.6	425.6	435.6	445.6
	v	0.02	4.56	4.64	4.71	4.78	4.86	4.94	5.01	5.08	5.15	5.22	5.29	5.36	5.43
	h	296.1	1185.8	1191.4	1196.9	1202.3	1207.7	1213.1	1218.4	1223.6	1228.7	1233.8	1238.9	1244.0	1249.0
	n	0.4714	1.6044	1.6115	1.6184	1.6251	1.6316	1.6380	1.6443	1.6504	1.6564	1.6623	1.6681	1.6737	1.6793
98	t	326.4		336.4	346.4	356.4	366.4	376.4	386.4	396.4	406.4	416.4	426.4	436.4	446.4
	v	0.02	4.51	4.59	4.66	4.74	4.81	4.89	4.96	5.03	5.10	5.17	5.24	5.31	5.38
	h	296.8	1186.0	1191.6	1197.1	1202.6	1208.0	1213.3	1218.6	1223.8	1229.0	1234.1	1239.2	1244.2	1249.2
	n	0.4724	1.6036	1.6107	1.6176	1.6244	1.6309	1.6373	1.6435	1.6496	1.6556	1.6615	1.6673	1.6730	1.6786
99	t	327.1		337.1	347.1	357.1	367.1	377.1	387.1	397.1	407.1	417.1	427.1	437.1	447.1
	v	0.02	4.47	4.55	4.62	4.69	4.77	4.84	4.91	4.98	5.05	5.12	5.19	5.26	5.32
	h	297.6	1186.2	1191.8	1197.3	1202.8	1208.2	1213.5	1218.8	1224.0	1229.2	1234.3	1239.4	1244.5	1249.5
	n	0.4733	1.6028	1.6099	1.6168	1.6236	1.6301	1.6365	1.6428	1.6489	1.6549	1.6608	1.6666	1.6722	1.6778

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°. Internal energy
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B.t.u. [log = 2.89 071]. = total heat − 144 Apv.
h = total heat in B.t.u. A = 1/J = 1.286 × 10⁻³ B.t.u. per ft. lb. [3.10 929]. Values for saturated steam
n = entropy. 144 A = 0.1852 [log = 1.26 764]. are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
448.7	458.7	468.7	478.7	488.7	498.7	508.7	518.7	568.7	618.7	668.7	718.7	818.7	918.7	t 88
6.02	6.10	6.17	6.25	6.32	6.40	6.47	6.54	6.91	7.27	7.63	7.98	8.68	9.36	v
1251.6	1256.5	1261.4	1266.4	1271.3	1276.2	1281.2	1286.1	1310.3	1334.4	1358.4	1382.4	1430.5	1478.8	h
1.6926	1.6980	1.7034	1.7087	1.7139	1.7190	1.7241	1.7291	1.7533	1.7761	1.7978	1.8185	1.8577	1.8941	n
449.5	459.5	469.5	479.5	489.5	499.5	509.5	519.5	569.5	619.5	669.5	719.5	819.5	919.5	t 89
5.96	6.03	6.11	6.18	6.25	6.33	6.40	6.48	6.84	7.19	7.54	7.89	8.58	9.26	v
1251.9	1256.8	1261.7	1266.7	1271.6	1276.5	1281.5	1286.4	1310.6	1334.7	1358.7	1382.7	1430.8	1479.1	h
1.6918	1.6972	1.7025	1.7078	1.7130	1.7181	1.7232	1.7282	1.7524	1.7752	1.7969	1.8176	1.8567	1.8931	n
450.3	460.3	470.3	480.3	490.3	500.3	510.3	520.3	570.3	620.3	670.3	720.3	820.3	920.3	t 90
5.90	5.97	6.04	6.12	6.19	6.26	6.34	6.40	6.76	7.11	7.45	7.80	8.49	9.16	v
1252.2	1257.1	1262.0	1266.9	1271.9	1276.8	1281.7	1286.6	1310.8	1334.9	1359.0	1383.0	1431.1	1479.4	h
1.6909	1.6963	1.7016	1.7069	1.7121	1.7172	1.7223	1.7273	1.7515	1.7743	1.7960	1.8166	1.8558	1.8921	n
451.1	461.1	471.1	481.1	491.1	501.1	511.1	521.1	571.1	621.1	671.1	721.1	821.1	921.1	t 91
5.83	5.91	5.98	6.05	6.13	6.20	6.27	6.34	6.69	7.04	7.38	7.72	8.40	9.07	v
1252.4	1257.3	1262.3	1267.2	1272.2	1277.1	1282.0	1286.9	1311.1	1335.2	1359.3	1383.3	1431.5	1479.8	h
1.6900	1.6954	1.7007	1.7060	1.7112	1.7163	1.7214	1.7264	1.7506	1.7734	1.7950	1.8157	1.8548	1.8912	n
451.8	461.8	471.8	481.8	491.8	501.8	511.8	521.8	571.8	621.8	671.8	721.8	821.8	921.8	t 92
5.78	5.85	5.92	5.99	6.06	6.13	6.20	6.28	6.62	6.96	7.30	7.65	8.32	8.98	v
1252.7	1257.6	1262.6	1267.5	1272.4	1277.4	1282.3	1287.2	1311.4	1335.5	1359.6	1383.6	1431.8	1480.1	h
1.6891	1.6945	1.6998	1.7051	1.7103	1.7154	1.7205	1.7255	1.7497	1.7725	1.7941	1.8148	1.8538	1.8902	n
452.6	462.6	472.6	482.6	492.6	502.6	512.6	522.6	572.6	622.6	672.6	722.6	822.6	922.6	t 93
5.72	5.79	5.86	5.93	6.00	6.07	6.14	6.21	6.56	6.90	7.23	7.57	8.23	8.89	v
1253.0	1257.9	1262.9	1267.8	1272.7	1277.6	1282.6	1287.5	1311.7	1335.8	1359.9	1383.9	1432.1	1480.4	h
1.6882	1.6936	1.6989	1.7042	1.7094	1.7145	1.7196	1.7246	1.7487	1.7715	1.7932	1.8139	1.8529	1.8892	n
453.4	463.4	473.4	483.4	493.4	503.4	513.4	523.4	573.4	623.4	673.4	723.4	823.4	923.4	t 94
5.66	5.73	5.80	5.87	5.94	6.01	6.08	6.15	6.49	6.83	7.16	7.50	8.15	8.80	v
1253.2	1258.2	1263.1	1268.1	1273.0	1277.9	1282.9	1287.8	1312.0	1336.1	1360.2	1384.2	1432.4	1480.7	h
1.6874	1.6928	1.6981	1.7033	1.7085	1.7136	1.7187	1.7237	1.7478	1.7706	1.7922	1.8129	1.8519	1.8882	n
454.1	464.1	474.1	484.1	494.1	504.1	514.1	524.1	574.1	624.1	674.1	724.1	824.1	924.1	t 95
5.60	5.67	5.74	5.81	5.88	5.95	6.02	6.09	6.43	6.76	7.09	7.42	8.06	8.72	v
1253.5	1258.4	1263.4	1268.3	1273.2	1278.2	1283.1	1288.1	1312.3	1336.4	1360.5	1384.6	1432.7	1481.0	h
1.6866	1.6920	1.6973	1.7025	1.7077	1.7128	1.7179	1.7229	1.7470	1.7698	1.7914	1.8121	1.8511	1.8873	n
454.9	464.9	474.9	484.9	494.9	504.9	514.9	524.9	574.9	624.9	674.9	724.9	824.9	924.9	t 96
5.55	5.62	5.69	5.76	5.82	5.89	5.96	6.03	6.37	6.70	7.03	7.35	7.99	8.63	v
1253.7	1258.7	1263.7	1268.6	1273.5	1278.4	1283.4	1288.3	1312.5	1336.7	1360.8	1384.8	1433.0	1481.3	h
1.6857	1.6911	1.6964	1.7016	1.7068	1.7119	1.7170	1.7220	1.7461	1.7688	1.7905	1.8112	1.8502	1.8864	n
455.6	465.6	475.6	485.6	495.6	505.6	515.6	525.6	575.6	625.6	675.6	725.6	825.6	925.6	t 97
5.50	5.56	5.63	5.70	5.77	5.84	5.90	5.97	6.30	6.63	6.95	7.28	7.91	8.55	v
1254.0	1258.9	1263.9	1268.9	1273.8	1278.7	1283.7	1288.6	1312.8	1337.0	1361.1	1385.1	1433.3	1481.6	h
1.6849	1.6903	1.6956	1.7008	1.7060	1.7111	1.7162	1.7212	1.7453	1.7680	1.7896	1.8103	1.8493	1.8855	n
456.4	466.4	476.4	486.4	496.4	506.4	516.4	526.4	576.4	626.4	676.4	726.4	826.4	926.4	t 98
5.44	5.51	5.58	5.65	5.71	5.78	5.85	5.91	6.24	6.57	6.89	7.21	7.84	8.47	v
1254.2	1259.2	1264.2	1269.1	1274.0	1279.0	1283.9	1288.9	1313.1	1337.2	1361.4	1385.4	1433.6	1481.9	h
1.6841	1.6895	1.6948	1.7000	1.7053	1.7104	1.7154	1.7204	1.7445	1.7672	1.7888	1.8095	1.8485	1.8846	n
457.1	467.1	477.1	487.1	497.1	507.1	517.1	527.1	577.1	627.1	677.1	727.1	827.1	927.1	t 99
5.39	5.46	5.52	5.59	5.66	5.72	5.79	5.86	6.18	6.50	6.82	7.14	7.76	8.39	v
1254.5	1259.4	1264.4	1269.4	1274.3	1279.3	1284.2	1289.1	1313.3	1337.5	1361.6	1385.7	1433.9	1482.2	h
1.6833	1.6887	1.6940	1.6993	1.7045	1.7096	1.7146	1.7196	1.7436	1.7664	1.7880	1.8087	1.8476	1.8838	n

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3 — Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
100	t	327.8		337.8	347.8	357.8	367.8	377.8	387.8	397.8	407.8	417.8	427.8	437.8	447.8
	v	0.02	4.43	4.51	4.58	4.65	4.72	4.79	4.86	4.93	5.00	5.07	5.14	5.21	5.27
	h	298.3	1186.3	1192.0	1197.5	1203.0	1208.4	1213.8	1219.1	1224.3	1229.5	1234.6	1239.7	1244.7	1249.7
	n	0.4743	1.6020	1.6091	1.6160	1.6228	1.6294	1.6358	1.6420	1.6481	1.6541	1.6600	1.6658	1.6714	1.6770
101	t	328.6		338.6	348.6	358.6	368.6	378.6	388.6	398.6	408.6	418.6	428.6	438.6	448.6
	v	0.02	4.39	4.47	4.54	4.61	4.68	4.75	4.82	4.89	4.96	5.02	5.09	5.16	5.22
	h	299.1	1186.5	1192.2	1197.7	1203.2	1208.6	1214.0	1219.3	1224.5	1229.7	1234.8	1239.9	1245.0	1250.0
	n	0.4752	1.6012	1.6083	1.6152	1.6220	1.6286	1.6350	1.6412	1.6473	1.6533	1.6592	1.6650	1.6706	1.6762
102	t	329.3		339.3	349.3	359.3	369.3	379.3	389.3	399.3	409.3	419.3	429.3	439.3	449.3
	v	0.02	4.35	4.42	4.49	4.56	4.64	4.71	4.78	4.84	4.91	4.98	5.04	5.11	5.18
	h	299.8	1186.7	1192.4	1197.9	1203.4	1208 8	1214.2	1219.5	1224.7	1229.9	1235.0	1240.1	1245.2	1250.2
	n	0.4762	1.6004	1.6076	1.6145	1.6212	1.6278	1.6343	1.6406	1.6467	1.6526	1.6585	1.6643	1.6699	1.6755
103	t	330.0		340.0	350.0	360.0	370.0	380.0	390.0	400.0	410.0	420.0	430.0	440.0	450.0
	v	0.02	4.31	4.38	4.45	4.52	4.59	4.66	4.73	4.80	4.87	4.93	5.00	5.06	5.13
	h	300.6	1186.9	1192.5	1198.1	1203.6	1209.1	1214.5	1219.8	1225.0	1230.1	1235.2	1240.4	1245.5	1250.5
	n	0.4771	1.5996	1.6068	1.6137	1.6204	1.6270	1.6334	1.6397	1.6458	1.6518	1.6577	1.6635	1.6691	1.6747
104	t	330.7		340.7	350.7	360.7	370.7	380.7	390.7	400.7	410.7	420.7	430.7	440.7	450.7
	v	0.02	4.27	4.34	4.41	4.48	4.55	4.62	4.69	4.75	4.82	4.89	4.95	5.02	5.09
	h	301.3	1187.0	1192.7	1198.3	1203.8	1209.2	1214 6	1219.9	1225.2	1230.4	1235.5	1240.6	1245.7	1250.7
	n	0.4780	1.5988	1.6060	1.6129	1.6197	1.6262	1.6326	1.6389	1.6450	1.6510	1.6569	1.6627	1.6683	1.6739
105	t	331.4		341.4	351.4	361.4	371.4	381.4	391.4	401.4	411.4	421.4	431.4	441.4	451.4
	v	0.02	4.23	4.30	4.37	4.44	4.51	4.58	4.65	4.71	4.78	4.84	4.91	4.97	5.04
	h	302.0	1187.2	1192.9	1198.5	1204.0	1209.5	1214 9	1220.2	1225.4	1230.6	1235.7	1240.8	1245.9	1250.9
	n	0.4789	1.5980	1.6052	1.6121	1.6189	1.6255	1.6319	1.6381	1.6442	1.6502	1.6561	1.6619	1.6676	1.6732
106	t	332.0		342.0	352.0	362.0	372.0	382 0	392.0	402.0	412.0	422.0	432.0	442.0	452.0
	v	0.02	4.19	4.26	4.33	4.40	4.47	4.54	4.60	4 67	4.74	4.80	4.86	4.93	4.99
	h	302.7	1187.4	1193.1	1198.7	1204.2	1209.7	1215.1	1220.4	1225.6	1230.8	1236.0	1241.1	1246.2	1251.2
	n	0.4798	1.5972	1.6044	1.6113	1.6181	1.6247	1.6311	1.6374	1.6435	1.6495	1.6554	1.6612	1.6668	1.6724
107	t	332.7		342.7	352.7	362.7	372.7	382 7	392.7	402.7	412.7	422.7	432.7	442.7	452.7
	v	0.02	4.16	4.23	4.29	4.36	4.43	4 50	4 57	4.63	4.70	4.76	4.82	4.89	4.95
	h	303.4	1187.5	1193.2	1198.8	1204 3	1209.8	1215.2	1220.6	1225.9	1231.1	1236.2	1241.3	1246.4	1251.4
	n	0.4807	1.5965	1.6037	1.6107	1.6175	1.6240	1.6304	1.6367	1.6428	1.6488	1.6547	1.6605	1.6661	1.6717
108	t	333.4		343.4	353.4	363.4	373.4	383.4	393.4	403.4	413.4	423.4	433.4	443.4	453.4
	v	0.02	4.12	4.19	4.25	4.32	4.39	4.46	4.53	4.59	4.66	4.72	4.78	4.85	4.91
	h	304.1	1187.7	1193.4	1199.0	1204.6	1210 1	1215.5	1220.8	1226.1	1231.3	1236.4	1241.5	1246.6	1251.6
	n	0.4816	1.5957	1.6029	1.6099	1.6167	1.6233	1.6297	1.6359	1.6420	1.6480	1.6539	1.6597	1.6654	1.6709
109	t	334.1		344.1	354.1	364.1	374.1	384.1	394.1	404.1	414.1	424.1	434.1	444.1	454.1
	v	0.02	4.08	4.15	4.22	4.29	4.35	4.42	4.49	4.55	4.62	4.68	4.74	4.80	4.87
	h	304.8	1187.9	1193.6	1199.2	1204.8	1210 3	1215.7	1221.0	1226.3	1231.5	1236.7	1241.8	1246.9	1251.9
	n	0.4825	1.5950	1.6022	1.6092	1.6160	1.6226	1.6290	1.6353	1.6414	1.6474	1.6533	1.6591	1.6647	1.6703
110	t	334.8		344.8	354.8	364.8	374.8	384.8	394.8	404.8	414.8	424.8	434.8	444.8	454.8
	v	0.02	4.05	4.12	4.18	4.25	4.32	4.38	4.45	4.51	4.57	4.64	4.70	4.76	4.83
	h	305.5	1188.0	1193.8	1199.4	1205.0	1210.5	1215.9	1221.2	1226.5	1231.7	1236.9	1242.0	1247.1	1252.1
	n	0.4834	1.5942	1.6014	1.6084	1.6152	1.6218	1.6282	1.6345	1.6406	1.6466	1.6525	1.6583	1.6640	1.6695
111	t	335.4		345.4	355.4	365.4	375.4	385.4	395.4	405.4	415.4	425.4	435.4	445.4	455.4
	v	0.02	4.01	4.08	4.14	4.21	4.28	4.35	4.41	4.47	4.54	4.60	4.66	4.72	4.79
	h	306.2	1188.2	1194.0	1199 6	1205.2	1210.7	1216.1	1221.4	1226.7	1231.9	1237.1	1242.2	1247.3	1252.3
	n	0.4843	1.5935	1.6007	1.6077	1.6145	1.6212	1.6276	1.6339	1.6400	1.6459	1.6518	1.6576	1.6633	1.6688
112	t	336.1		346.1	356.1	366.1	376.1	386.1	396.1	406.1	416.1	426.1	436.1	446.1	456.1
	v	0.02	3.98	4.05	4.11	4.18	4.24	4.31	4.37	4.43	4.50	4.56	4.62	4.68	4.75
	h	306.9	1188.4	1194.1	1199.8	1205.4	1210.9	1216.3	1221.7	1227.0	1232.2	1237.4	1242.5	1247.6	1252.6
	n	0.4852	1.5928	1.6000	1.6070	1.6138	1.6205	1.6269	1.6332	1.6393	1.6453	1.6512	1.6570	1.6626	1.6682

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
457.8	467.8	477.8	487.8	497.8	507.8	517.8	527.8	577.8	627.8	677.8	727.8	827.8	927.8	t 100
5.34	5.41	5.47	5.54	5.61	5.67	5.74	5.80	6.12	6.44	6.75	7.07	7.69	8.31	v
1254.7	1259.7	1264.7	1269.6	1274.6	1279.5	1284.5	1289.4	1313.6	1337.8	1361.9	1385.9	1434.1	1482.5	h
1.6826	1.6880	1.6933	1.6985	1.7037	1.7088	1.7138	1.7188	1.7428	1.7656	1.7872	1.8079	1.8468	1.8829	n
458.6	468.6	478.6	488.6	498.6	508.6	518.6	528.6	578.6	628.6	678.6	728.6	828.6	928.6	t 101
5.29	5.36	5.42	5.49	5.56	5.62	5.68	5.75	6.07	6.38	6.69	7.01	7.62	8.24	v
1255.0	1260.0	1264.9	1269.9	1274.8	1279.8	1284.7	1289.6	1313.9	1338.1	1362.2	1386.2	1434.4	1482.8	h
1.6818	1.6872	1.6925	1.6977	1.7029	1.7080	1.7130	1.7180	1.7420	1.7647	1.7863	1.8071	1.8459	1.8820	n
459.3	469.3	479.3	489.3	499.3	509.3	519.3	529.3	579.3	629.3	679.3	729.3	829.3	929.3	t 102
5.24	5.31	5.37	5.44	5.50	5.57	5.63	5.70	6.02	6.33	6.63	6.94	7.55	8.16	v
1255.2	1260.2	1265.2	1270.2	1275.1	1280.0	1285.0	1289.9	1314.1	1338.3	1362.4	1386.5	1434.7	1483.1	h
1.6810	1.6864	1.6917	1.6969	1.7021	1.7072	1.7122	1.7172	1.7412	1.7639	1.7855	1.8062	1.8451	1.8812	n
460.0	470.0	480.0	490.0	500.0	510.0	520.0	530.0	580.0	630.0	680.0	730.0	830.0	930.0	t 103
5.19	5.26	5.32	5.39	5.45	5.52	5.58	5.64	5.96	6.27	6.57	6.88	7.48	8.08	v
1255.5	1260.4	1265.4	1270.4	1275.3	1280.3	1285.2	1290.1	1314.4	1338.6	1362.7	1386.8	1435.0	1483.4	h
1.6802	1.6856	1.6909	1.6961	1.7013	1.7064	1.7114	1.7164	1.7404	1.7631	1.7847	1.8054	1.8442	1.8803	n
460.7	470.7	480.7	490.7	500.7	510.7	520.7	530.7	580.7	630.7	680.7	730.7	830.7	930.7	t 104
5.15	5.21	5.28	5.34	5.40	5.47	5.53	5.59	5.90	6.21	6.51	6.82	7.41	8.01	v
1255.7	1260.7	1265.6	1270.6	1275.6	1280.5	1285.5	1290.4	1314.6	1338.8	1362.9	1387.0	1435.2	1483.6	h
1.6794	1.6848	1.6901	1.6954	1.7006	1.7056	1.7106	1.7156	1.7396	1.7623	1.7839	1.8046	1.8434	1.8795	n
461.4	471.4	481.4	491.4	501.4	511.4	521.4	531.4	581.4	631.4	681.4	731.4	831.4	931.4	t 105
5.10	5.17	5.23	5.29	5.36	5.42	5.48	5.54	5.85	6.15	6.45	6.76	7.35	7.94	v
1255.9	1260.9	1265.9	1270.9	1275.8	1280.7	1285.7	1290.6	1314.9	1339.1	1363.2	1387.3	1435.5	1483.9	h
1.6787	1.6841	1.6894	1.6946	1.6997	1.7048	1.7098	1.7148	1.7388	1.7614	1.7830	1.8037	1.8426	1.8786	n
462.0	472.0	482.0	492.0	502.0	512.0	522.0	532.0	582.0	632.0	682.0	732.0	832.0	932.0	t 106
5.06	5.12	5.18	5.25	5.31	5.37	5.43	5.49	5.80	6.10	6.40	6.70	7.29	7.87	v
1256.2	1261.2	1266.1	1271.1	1276.1	1281.0	1286.0	1290.9	1315.2	1339.4	1363.5	1387.6	1435.8	1484.2	h
1.6779	1.6833	1.6886	1.6938	1.6990	1.7041	1.7091	1.7140	1.7380	1.7606	1.7822	1.8029	1.8417	1.8777	n
462.7	472.7	482.7	492.7	502.7	512.7	522.7	532.7	582.7	632.7	682.7	732.7	832.7	932.7	t 107
5.02	5.08	5.14	5.21	5.27	5.33	5.39	5.45	5.75	6.05	6.34	6.64	7.22	7.80	v
1256.4	1261.4	1266.4	1271.4	1276.3	1281.2	1286.2	1291.1	1315.4	1339.6	1363.7	1387.8	1436.0	1484.4	h
1.6772	1.6826	1.6879	1.6931	1.6983	1.7034	1.7084	1.7133	1.7373	1.7599	1.7815	1.8022	1.8410	1.8769	n
463.4	473.4	483.4	493.4	503.4	513.4	523.4	533.4	583.4	633.4	683.4	733.4	833.4	933.4	t 108
4.98	5.04	5.10	5.16	5.22	5.28	5.34	5.40	5.70	6.00	6.29	6.58	7.16	7.73	v
1256.6	1261.6	1266.6	1271.6	1276.6	1281.5	1286.5	1291.4	1315.7	1339.9	1364.0	1388.1	1436.3	1484.7	h
1.6764	1.6818	1.6871	1.6923	1.6975	1.7026	1.7076	1.7125	1.7365	1.7591	1.7806	1.8013	1.8401	1.8761	n
464.1	474.1	484.1	494.1	504.1	514.1	524.1	534.1	584.1	634.1	684.1	734.1	834.1	934.1	t 109
4.93	4.99	5.05	5.12	5.18	5.24	5.29	5.35	5.65	5.95	6.24	6.53	7.10	7.66	v
1256.9	1261.9	1266.8	1271.8	1276.8	1281.7	1286.7	1291.6	1315.9	1340.1	1364.3	1388.4	1436.6	1485.0	h
1.6758	1.6812	1.6864	1.6916	1.6968	1.7019	1.7069	1.7118	1.7358	1.7584	1.7799	1.8006	1.8393	1.8753	n
464.8	474.8	484.8	494.8	504.8	514.8	524.8	534.8	584.8	634.8	684.8	734.8	834.8	934.8	t 110
4.89	4.95	5.01	5.07	5.13	5.19	5.25	5.31	5.61	5.90	6.19	6.47	7.03	7.59	v
1257.1	1262.1	1267.1	1272.1	1277.0	1282.0	1287.0	1291.9	1316.2	1340.4	1364.5	1388.6	1436.8	1485.2	h
1.6750	1.6804	1.6857	1.6909	1.6960	1.7011	1.7061	1.7110	1.7350	1.7576	1.7791	1.7997	1.8384	1.8744	n
465.4	475.4	485.4	495.4	505.4	515.4	525.4	535.4	585.4	635.4	685.4	735.4	835.4	935.4	t 111
4.85	4.91	4.97	5.03	5.09	5.15	5.20	5.26	5.56	5.85	6.14	6.42	6.97	7.53	v
1257.3	1262.3	1267.3	1272.3	1277.3	1282.2	1287.2	1292.1	1316.4	1340.6	1364.8	1388.9	1437.1	1485.5	h
1.6743	1.6797	1.6850	1.6902	1.6953	1.7004	1.7054	1.7103	1.7343	1.7569	1.7783	1.7990	1.8377	1.8736	n
466.1	476.1	486.1	496.1	506.1	516.1	526.1	536.1	586.1	636.1	686.1	736.1	836.1	936.1	t 112
4.81	4.87	4.93	4.99	5.05	5.10	5.16	5.22	5.51	5.80	6.08	6.36	6.92	7.46	v
1257.6	1262.6	1267.6	1272.5	1277.5	1282.4	1287.4	1292.4	1316.6	1340.8	1365.0	1389.2	1437.4	1485.8	h
1.6736	1.6790	1.6843	1.6895	1.6946	1.6997	1.7047	1.7096	1.7336	1.7562	1.7776	1.7982	1.8369	1.8728	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
113	t	336.8		346.8	356.8	366.8	376.8	386.8	396.8	406.8	416.8	426.8	436.8	446.8	456.8
	v	0.02	3.95	4.01	4.07	4.14	4.21	4.27	4.34	4.40	4.46	4.52	4.58	4.64	4.71
	h	307.6	1188.5	1194.3	1200.0	1205.6	1211.1	1216.5	1221.9	1227.2	1232.4	1237.5	1242.6	1247.7	1252.7
	n	0.4860	1.5921	1.5993	1.6063	1.6131	1.6198	1.6262	1.6325	1.6387	1.6447	1.6505	1.6563	1.6619	1.6675
114	t	337.4		347.4	357.4	367.4	377.4	387.4	397.4	407.4	417.4	427.4	437.4	447.4	457.4
	v	0.02	3.91	3.98	4.04	4.11	4.17	4.24	4.30	4.36	4.42	4.49	4.55	4.61	4.67
	h	308.3	1188.7	1194.4	1200.1	1205.7	1211.2	1216.7	1222.1	1227.4	1232.6	1237.7	1242.9	1248.0	1253.0
	n	0.4869	1.5914	1.5986	1.6057	1.6125	1.6191	1.6256	1.6319	1.6380	1.6440	1.6498	1.6556	1.6613	1.6668
115	t	338.1		348.1	358.1	368.1	378.1	388.1	398.1	408.1	418.1	428.1	438.1	448.1	458.1
	v	0.02	3.88	3.95	4.01	4.08	4.14	4.20	4.27	4.33	4.39	4.45	4.51	4.57	4.63
	h	309.0	1188.8	1194.6	1200.3	1205.9	1211.4	1216.9	1222.3	1227.6	1232.8	1237.9	1243.1	1248.2	1253.2
	n	0.4877	1.5907	1.5979	1.6050	1.6118	1.6185	1.6249	1.6312	1.6373	1.6433	1.6492	1.6549	1.6606	1.6661
116	t	338.7		348.7	358.7	368.7	378.7	388.7	398.7	408.7	418.7	428.7	438.7	448.7	458.7
	v	0.02	3.85	3.92	3.98	4.04	4.10	4.17	4.23	4.29	4.35	4.41	4.47	4.53	4.59
	h	309.6	1189.0	1194.8	1200.5	1206.1	1211.6	1217.1	1222.5	1227.8	1233.0	1238.1	1243.3	1248.4	1253.4
	n	0.4886	1.5900	1.5972	1.6043	1.6111	1.6178	1.6242	1.6305	1.6366	1.6426	1.6485	1.6543	1.6599	1.6654
117	t	339.4		349.4	359.4	369.4	379.4	389.4	399.4	409.4	419.4	429.4	439.4	449.4	459.4
	v	0.02	3.82	3.88	3.94	4.01	4.07	4.14	4.20	4.26	4.32	4.38	4.44	4.50	4.56
	h	310.3	1189.1	1194.9	1200.7	1206.3	1211.8	1217.3	1222.7	1228.0	1233.2	1238.3	1243.5	1248.6	1253.6
	n	0.4894	1.5893	1.5965	1.6036	1.6104	1.6171	1.6235	1.6298	1.6360	1.6419	1.6478	1.6536	1.6592	1.6647
118	t	340.0		350.0	360.0	370.0	380.0	390.0	400.0	410.0	420.0	430.0	440.0	450.0	460.0
	v	0.02	3.79	3.85	3.91	3.98	4.04	4.10	4.16	4.22	4.28	4.34	4.40	4.46	4.52
	h	311.0	1189.3	1195.1	1200.8	1206.4	1212.0	1217.5	1222.9	1228.2	1233.4	1238.5	1243.7	1248.8	1253.8
	n	0.4903	1.5887	1.5959	1.6029	1.6097	1.6164	1.6229	1.6292	1.6353	1.6412	1.6471	1.6529	1.6586	1.6641
119	t	340.6		350.6	360.6	370.6	380.6	390.6	400.6	410.6	420.6	430.6	440.6	450.6	460.6
	v	0.02	3.76	3.82	3.88	3.95	4.01	4.07	4.13	4.19	4.25	4.31	4.37	4.42	4.48
	h	311.6	1189.4	1195.2	1201.0	1206.7	1212.2	1217.7	1223.1	1228.4	1233.6	1238.7	1243.9	1249.0	1254.0
	n	0.4911	1.5880	1.5953	1.6023	1.6092	1.6159	1.6223	1.6286	1.6347	1.6407	1.6466	1.6523	1.6580	1.6635
120	t	341.3		351.3	361.3	371.3	381.3	391.3	401.3	411.3	421.3	431.3	441.3	451.3	461.3
	v	0.02	3.73	3.79	3.85	3.92	3.98	4.04	4.10	4.16	4.22	4.28	4.33	4.39	4.45
	h	312.3	1189.6	1195.4	1201.1	1206.8	1212.4	1217.9	1223.3	1228.6	1233.8	1238.9	1244.1	1249.2	1254.2
	n	0.4919	1.5873	1.5946	1.6016	1.6085	1.6152	1.6216	1.6279	1.6340	1.6400	1.6459	1.6517	1.6573	1.6628
121	t	341.9		351.9	361.9	371.9	381.9	391.9	401.9	411.9	421.9	431.9	441.9	451.9	461.9
	v	0.02	3.70	3.76	3.82	3.88	3.94	4.00	4.06	4.12	4.18	4.24	4.30	4.36	4.41
	h	313.0	1189.7	1195.6	1201.4	1207.0	1212.5	1218.0	1223.4	1228.8	1234.0	1239.1	1244.3	1249.4	1254.4
	n	0.4927	1.5866	1.5939	1.6010	1.6078	1.6145	1.6209	1.6272	1.6334	1.6393	1.6452	1.6510	1.6566	1.6621
122	t	342.5		352.5	362.5	372.5	382.5	392.5	402.5	412.5	422.5	432.5	442.5	452.5	462.5
	v	0.02	3.67	3.73	3.79	3.85	3.91	3.97	4.03	4.09	4.15	4.21	4.27	4.32	4.38
	h	313.6	1189.8	1195.7	1201.5	1207.2	1212.7	1218.2	1223.6	1228.9	1234.2	1239.3	1244.5	1249.6	1254.6
	n	0.4935	1.5859	1.5932	1.6003	1.6071	1.6138	1.6202	1.6265	1.6327	1.6387	1.6446	1.6503	1.6559	1.6614
123	t	343.2		353.2	363.2	373.2	383.2	393.2	403.2	413.2	423.2	433.2	443.2	453.2	463.2
	v	0.02	3.64	3.70	3.76	3.82	3.88	3.94	4.00	4.06	4.12	4.18	4.23	4.29	4.35
	h	314.3	1190.0	1195.9	1201.7	1207.4	1212.9	1218.4	1223.8	1229.1	1234.3	1239.5	1244.7	1249.8	1254.8
	n	0.4943	1.5853	1.5926	1.5997	1.6066	1.6133	1.6197	1.6260	1.6321	1.6381	1.6440	1.6497	1.6554	1.6609
124	t	343.8		353.8	363.8	373.8	383.8	393.8	403.8	413.8	423.8	433.8	443.8	453.8	463.8
	v	0.02	3.61	3.67	3.73	3.79	3.85	3.91	3.97	4.03	4.09	4.14	4.20	4.26	4.31
	h	314.9	1190.1	1196.0	1201.8	1207.5	1213.1	1218.6	1224.0	1229.3	1234.5	1239.7	1244.9	1250.0	1255.0
	n	0.4951	1.5846	1.5919	1.5990	1.6059	1.6126	1.6190	1.6253	1.6315	1.6374	1.6433	1.6491	1.6547	1.6602

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°. Internal energy
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071]. = total heat − 144 Apv.
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [$\bar{3}$.10 929]. Values for saturated steam
n = entropy. 144 A = 0.1852 [log = $\bar{1}$.26 764]. are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.	
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		
466.8	476.8	486.8	496.8	506.8	516.8	526.8	536.8	586.8	636.8	686.8	736.8	836.8	936.8	t	113
4.77	4.82	4.88	4.94	5.00	5.06	5.12	5.18	5.48	5.76	6.04	6.31	6.86	7.40	v	
1257.8	1262.8	1267.8	1272.8	1277.7	1282.6	1287.6	1292.6	1316.9	1341.1	1365.3	1389.4	1437.7	1486.0	h	
1.6730	1.6783	1.6836	1.6888	1.6939	1.6990	1.7040	1.7089	1.7329	1.7554	1.7769	1.7975	1.8362	1.8721	n	
467.4	477.4	487.4	497.4	507.4	517.4	527.4	537.4	587.4	637.4	687.4	737.4	837.4	937.4	t	114
4.73	4.78	4.84	4.90	4.96	5.02	5.07	5.13	5.42	5.70	5.98	6.25	6.80	7.34	v	
1258.0	1263.0	1268.0	1273.0	1278.0	1282.9	1287.9	1292.8	1317.1	1341.3	1365.5	1389.6	1437.9	1486.3	h	
1.6723	1.6777	1.6829	1.6881	1.6932	1.6983	1.7033	1.7082	1.7322	1.7547	1.7761	1.7967	1.8354	1.8713	n	
468.1	478.1	488.1	498.1	508.1	518.1	528.1	538.1	588.1	638.1	688.1	738.1	838.1	938.1	t	115
4.69	4.75	4.81	4.87	4.92	4.98	5.03	5.09	5.38	5.66	5.93	6.20	6.75	7.28	v	
1258.2	1263.2	1268.2	1273.2	1278.2	1283.1	1288.1	1293.0	1317.3	1341.5	1365.7	1389.9	1438.1	1486.5	h	
1.6716	1.6770	1.6822	1.6874	1.6925	1.6976	1.7026	1.7075	1.7314	1.7540	1.7754	1.7960	1.8347	1.8706	n	
468.7	478.7	488.7	498.7	508.7	518.7	528.7	538.7	588.7	638.7	688.7	738.7	838.7	938.7	t	116
4.65	4.71	4.77	4.83	4.88	4.94	4.99	5.05	5.33	5.61	5.88	6.15	6.69	7.22	v	
1258.4	1263.4	1268.4	1273.4	1278.4	1283.3	1288.3	1293.3	1317.6	1341.8	1366.0	1390.1	1438.4	1486.8	h	
1.6709	1.6763	1.6815	1.6867	1.6918	1.6969	1.7019	1.7068	1.7307	1.7533	1.7747	1.7953	1.8340	1.8698	n	
469.4	479.4	489.4	499.4	509.4	519.4	529.4	539.4	589.4	639.4	689.4	739.4	839.4	939.4	t	117
4.61	4.67	4.73	4.79	4.84	4.90	4.95	5.01	5.29	5.56	5.83	6.10	6.63	7.16	v	
1258.6	1263.6	1268.6	1273.6	1278.6	1283.6	1288.6	1293.5	1317.8	1342.0	1366.2	1390.4	1438.6	1487.1	h	
1.6702	1.6756	1.6809	1.6861	1.6912	1.6962	1.7012	1.7061	1.7300	1.7526	1.7740	1.7945	1.8332	1.8691	n	
470.0	480.0	490.0	500.0	510.0	520.0	530.0	540.0	590.0	640.0	690.0	740.0	840.0	940.0	t	118
4.57	4.63	4.69	4.75	4.80	4.86	4.91	4.97	5.25	5.52	5.79	6.06	6.58	7.11	v	
1258.9	1263.9	1268.9	1273.9	1278.8	1283.8	1288.8	1293.7	1318.0	1342.3	1366.5	1390.6	1438.9	1487.3	h	
1.6696	1.6749	1.6802	1.6854	1.6905	1.6955	1.7005	1.7054	1.7293	1.7518	1.7732	1.7938	1.8325	1.8683	n	
470.6	480.6	490.6	500.6	510.6	520.6	530.6	540.6	590.6	640.6	690.6	740.6	840.6	940.6	t	119
4.54	4.60	4.66	4.71	4.77	4.82	4.87	4.93	5.21	5.48	5.74	6.01	6.53	7.05	v	
1259.1	1264.1	1269.1	1274.1	1279.0	1284.0	1289.0	1293.9	1318.2	1342.4	1366.6	1390.8	1439.1	1487.6	h	
1.6690	1.6743	1.6796	1.6848	1.6899	1.6949	1.6999	1.7048	1.7287	1.7512	1.7726	1.7932	1.8318	1.8677	n	
471.3	481.3	491.3	501.3	511.3	521.3	531.3	541.3	591.3	641.3	691.3	741.3	841.3	941.3	t	120
4.50	4.56	4.62	4.68	4.73	4.78	4.83	4.89	5.17	5.44	5.70	5.96	6.48	6.99	v	
1259.3	1264.3	1269.3	1274.3	1279.2	1284.2	1289.2	1294.1	1318.4	1342.7	1366.9	1391.0	1439.4	1487.8	h	
1.6683	1.6736	1.6789	1.6841	1.6893	1.6943	1.6992	1.7041	1.7280	1.7505	1.7719	1.7924	1.8311	1.8669	n	
471.9	481.9	491.9	501.9	511.9	521.9	531.9	541.9	591.9	641.9	691.9	741.9	841.9	941.9	t	121
4.47	4.53	4.58	4.64	4.69	4.75	4.80	4.86	5.13	5.40	5.66	5.92	6.43	6.94	v	
1259.5	1264.5	1269.5	1274.5	1279.4	1284.4	1289.4	1294.4	1318.7	1342.9	1367.1	1391.3	1439.6	1488.0	h	
1.6676	1.6730	1.6782	1.6834	1.6886	1.6936	1.6985	1.7034	1.7273	1.7498	1.7712	1.7917	1.8303	1.8662	n	
472.5	482.5	492.5	502.5	512.5	522.5	532.5	542.5	592.5	642.5	692.5	742.5	842.5	942.5	t	122
4.43	4.49	4.55	4.60	4.66	4.71	4.76	4.82	5.09	5.35	5.61	5.87	6.38	6.88	v	
1259.7	1264.7	1269.7	1274.7	1279.6	1284.6	1289.6	1294.6	1318.9	1343.1	1367.3	1391.5	1439.8	1488.3	h	
1.6669	1.6723	1.6775	1.6827	1.6879	1.6929	1.6978	1.7027	1.7266	1.7491	1.7705	1.7910	1.8296	1.8655	n	
473.2	483.2	493.2	503.2	513.2	523.2	533.2	543.2	593.2	643.2	693.2	743.2	843.2	943.2	t	123
4.40	4.46	4.51	4.57	4.62	4.67	4.72	4.78	5.05	5.31	5.57	5.83	6.33	6.83	v	
1259.9	1264.9	1269.9	1274.9	1279.9	1284.9	1289.9	1294.8	1319.1	1343.4	1367.6	1391.8	1440.1	1488.5	h	
1.6663	1.6717	1.6769	1.6821	1.6873	1.6923	1.6972	1.7021	1.7259	1.7484	1.7698	1.7903	1.8289	1.8648	n	
473.8	483.8	493.8	503.8	513.8	523.8	533.8	543.8	593.8	643.8	693.8	743.8	843.8	943.8	t	124
4.36	4.42	4.48	4.53	4.58	4.64	4.69	4.74	5.01	5.27	5.53	5.78	6.28	6.78	v	
1260.1	1265.1	1270.1	1275.1	1280.1	1285.1	1290.1	1295.0	1319.3	1343.6	1367.8	1392.0	1440.3	1488.7	h	
1.6657	1.6710	1.6762	1.6814	1.6865	1.6916	1.6966	1.7015	1.7252	1.7477	1.7691	1.7896	1.8282	1.8640	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795]. To change degs. C. to degs. F., multiply by 9/5, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by 9/5. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
125	t	344.4		354.4	364.4	374.4	384.4	394.4	404.4	414.4	424.4	434.4	444.4	454.4	464.4
	v	0.02	3.58	3.64	3.70	3.76	3.82	3.88	3.94	4.00	4.06	4.11	4.17	4.22	4.28
	h	315.5	1190.3	1196.2	1202.0	1207.7	1213.3	1218.8	1224.2	1229.5	1234.8	1240.0	1245.1	1250.2	1255.3
	n	0.4959	1.5839	1.5913	1.5983	1.6052	1.6119	1.6183	1.6246	1.6307	1.6367	1.6426	1.6484	1.6540	1.6595
126	t	345.0		355.0	365.0	375.0	385.0	395.0	405.0	415.0	425.0	435.0	445.0	455.0	465.0
	v	0.02	3.56	3.62	3.68	3.74	3.80	3.86	3.91	3.97	4.02	4.08	4.14	4.19	4.25
	h	316.2	1190.4	1196.3	1202.1	1207.8	1213.4	1219.0	1224.4	1229.7	1234.9	1240.1	1245.3	1250.4	1255.5
	n	0.4967	1.5832	1.5906	1.5976	1.6045	1.6112	1.6177	1.6240	1.6301	1.6361	1.6420	1.6477	1.6533	1.6588
127	t	345.6		355.6	365.6	375.6	385.6	395.6	405.6	415.6	425.6	435.6	445.6	455.6	465.6
	v	0.02	3.53	3.59	3.65	3.71	3.77	3.83	3.88	3.94	4.00	4.05	4.11	4.16	4.22
	h	316.8	1190.5	1196.5	1202.3	1208.0	1213.6	1219.1	1224.6	1229.9	1235.1	1240.3	1245.5	1250.6	1255.7
	n	0.4974	1.5825	1.5899	1.5970	1.6038	1.6105	1.6170	1.6233	1.6295	1.6355	1.6413	1.6470	1.6526	1.6581
128	t	346.2		356.2	366.2	376.2	386.2	396.2	406.2	416.2	426.2	436.2	446.2	456.2	466.2
	v	0.02	3.50	3.56	3.62	3.68	3.74	3.80	3.86	3.91	3.97	4.02	4.08	4.13	4.19
	h	317.4	1190.7	1196 7	1202.5	1208.2	1213 8	1219.3	1224 8	1230 1	1235.3	1240.5	1245.7	1250.8	1255.9
	n	0.4982	1.5819	1.5893	1.5964	1.6033	1.6100	1.6164	1.6227	1.6289	1.6349	1.6407	1.6464	1.6520	1.6575
129	t	346.8		356.8	366.8	376.8	386.8	396.8	406.8	416.8	426 8	436.8	446.8	456.8	466.8
	v	0.02	3.48	3.54	3.59	3.65	3.71	3.77	3.83	3.88	3.94	3.99	4.05	4.10	4.16
	h	318 0	1190.9	1196.8	1202.6	1208.3	1213.9	1219.4	1224.9	1230 3	1235.5	1240.7	1245.9	1251.0	1256.1
	n	0.4990	1.5813	1.5887	1.5958	1.6027	1.6094	1.6158	1.6221	1.6283	1.6343	1.6402	1.6459	1.6515	1.6570
130	t	347.4		357.4	367.4	377.4	387.4	397.4	407.4	417.4	427.4	437.4	447.4	457.4	467.4
	v	0 02	3.45	3.51	3.57	3.63	3.69	3.74	3 80	3.85	3.91	3.96	4.02	4.07	4.13
	h	318.6	1191.0	1197.0	1202.8	1208.5	1214.1	1219.7	1225.1	1230.4	1235.7	1240.9	1246.1	1251.2	1256.3
	n	0.4998	1.5807	1.5881	1.5952	1.6021	1.6088	1.6153	1.6216	1 6277	1.6337	1.6396	1.6453	1.6509	1.6564
131	t	348.0		358.0	368.0	378 0	388.0	398.0	408.0	418 0	428.0	438.0	448.0	458.0	468.0
	v	0.02	3.43	3.49	3.54	3.60	3.66	3.72	3.77	3.83	3.88	3.94	3.99	4.05	4.10
	h	319.3	1191.1	1197.1	1203.0	1208.7	1214.3	1219.8	1225 2	1230 6	1235.9	1241.1	1246.3	1251.4	1256.5
	n	0.5005	1.5801	1.5875	1.5946	1.6015	1.6082	1.6147	1.6210	1.6271	1.6331	1.6390	1.6447	1.6503	1.6558
132	t	348.5		358.5	368.5	378.5	388.5	398.5	408 5	418 5	428 5	438.5	448 5	458.5	468.5
	v	0.02	3.40	3.46	3.52	3.58	3 63	3.69	3.75	3 80	3.85	3.91	3.96	4.02	4.07
	h	319.9	1191.2	1197.2	1203.1	1208.8	1214.4	1220.0	1225.5	1230.8	1236.1	1241.3	1246.5	1251.6	1256.7
	n	0.5013	1.5795	1.5869	1.5940	1.6009	1.6077	1.6141	1.6204	1.6265	1.6325	1.6384	1.6441	1.6498	1.6553
133	t	349.1		359.1	369.1	379.1	389.1	399.1	409.1	419.1	429.1	439.1	449.1	459.1	469.1
	v	0.02	3.38	3.44	3.49	3.55	3.61	3.66	3.72	3.77	3.83	3.88	3.94	3.99	4.04
	h	320.5	1191.3	1197.4	1203.3	1209.0	1214.6	1220.1	1225.6	1231.0	1236.3	1241.5	1246.7	1251.8	1256.8
	n	0.5020	1.5789	1.5863	1.5935	1.6004	1.6071	1.6136	1.6199	1.6260	1.6320	1.6379	1.6436	1.6492	1.6547
134	t	349.7		359.7	369.7	379.7	389.7	399.7	409.7	419.7	429.7	439.7	449.7	459.7	469.7
	v	0.02	3.35	3.41	3.47	3.53	3.58	3.64	3.69	3.74	3.80	3.85	3.91	3.96	4.01
	h	321.1	1191.5	1197.5	1203.4	1209.2	1214.9	1220.4	1225.8	1231.2	1236 5	1241.7	1246.9	1252.0	1257.0
	n	0.5028	1.5783	1.5857	1.5929	1.5998	1.6065	1.6130	1.6193	1.6254	1.6314	1.6373	1.6430	1.6486	1.6541
135	t	350.3		360.3	370.3	380.3	390.3	400.3	410.3	420.3	430.3	440.3	450.3	460.3	470.3
	v	0.02	3.33	3.39	3.44	3.50	3.56	3.61	3.67	3.72	3.77	3.83	3.88	3.93	3.98
	h	321.7	1191.6	1197.6	1203.5	1209.3	1215.0	1220.6	1226.1	1231.4	1236.6	1241.8	1247.0	1252.1	1257.2
	n	0.5035	1.5777	1.5852	1.5923	1.5992	1.6059	1.6124	1.6187	1.6248	1.6308	1.6367	1.6424	1.6480	1.6535
136	t	350.8		360.8	370.8	380.8	390.8	400.8	410.8	420.8	430.8	440.8	450.8	460.8	470.8
	v	0.02	3.31	3.37	3.42	3.48	3.53	3.59	3.64	3.70	3.75	3.80	3.85	3.90	3.96
	h	322.3	1191.7	1197.8	1203.7	1209.5	1215.1	1220.7	1226.2	1231.5	1236.8	1242.0	1247.2	1252.3	1257.4
	n	0.5043	1.5771	1.5846	1.5917	1.5986	1.6053	1.6118	1.6181	1.6243	1.6303	1.6361	1.6418	1.6474	1.6529
137	t	351.4		361.4	371.4	381.4	391.4	401.4	411.4	421.4	431.4	441.4	451.4	461.4	471.4
	v	0.02	3.29	3.35	3.40	3.45	3.51	3.56	3.62	3.67	3.72	3.77	3.83	3.88	3.93
	h	322.8	1191.8	1197.9	1203.8	1209.6	1215.3	1220.9	1226.3	1231.7	1237.0	1242.2	1247.4	1252.5	1257.6
	n	0.5050	1.5765	1.5840	1.5911	1.5980	1.6047	1.6112	1.6176	1.6237	1.6297	1.6355	1.6412	1.6469	1.6524

Degrees of Superheat															
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		Press. lbs.
474.4	484.4	494.4	504.4	514.4	524.4	534.4	544.4	594.4	644.4	694.4	744.4	844.4	944.4	t	125
4.33	4.39	4.45	4.50	4.55	4.60	4.65	4.71	4.97	5.23	5.49	5.74	6.24	6.73	v	
1260.4	1265.4	1270.4	1275.4	1280.3	1285.3	1290.3	1295.2	1319.5	1343.8	1368.0	1392.2	1440.6	1489.0	h	
1.6650	1.6703	1.6755	1.6807	1.6858	1.6909	1.6959	1.7007	1.7245	1.7470	1.7684	1.7889	1.8275	1.8633	n	
475.0	485.0	495.0	505.0	515.0	525.0	535.0	545.0	595.0	645.0	695.0	745.0	845.0	945.0	t	126
4.30	4.36	4.41	4.47	4.52	4.57	4.62	4.68	4.94	5.20	5.45	5.70	6.19	6.68	v	
1260.6	1265.6	1270.6	1275.6	1280.5	1285.5	1290.5	1295.4	1319.7	1344.0	1368.2	1392.4	1440.8	1489.2	h	
1.6643	1.6696	1.6748	1.6800	1.6851	1.6902	1.6952	1.7000	1.7238	1.7463	1.7677	1.7881	1.8267	1.8625	n	
475.6	485.6	495.6	505.6	515.6	525.6	535.6	545.6	595.6	645.6	695.6	745.6	845.6	945.6	t	127
4.27	4.32	4.38	4.43	4.49	4.54	4.59	4.64	4.90	5.16	5.41	5.66	6.15	6.63	v	
1260.8	1265.8	1270.8	1275.8	1280.7	1285.7	1290.7	1295.6	1319.9	1344.2	1368.4	1392.6	1441.0	1489.4	h	
1.6636	1.6690	1.6742	1.6794	1.6845	1.6895	1.6945	1.6993	1.7231	1.7456	1.7670	1.7874	1.8260	1.8618	n	
476.2	486.2	496.2	506.2	516.2	526.2	536.2	546.2	596.2	646.2	696.2	746.2	846.2	946.2	t	128
4.24	4.29	4.35	4.40	4.45	4.50	4.55	4.61	4.86	5.12	5.37	5.62	6.10	6.58	v	
1261.0	1266.0	1271.0	1276.0	1281.0	1285.9	1290.9	1295.8	1320.1	1344.4	1368.6	1392.8	1441.2	1489.7	h	
1.6630	1.6684	1.6736	1.6788	1.6839	1.6889	1.6939	1.6987	1.7225	1.7450	1.7663	1.7868	1.8253	1.8611	n	
476.8	486.8	496.8	506.8	516.8	526.8	536.8	546.8	596.8	646.8	696.8	746.8	846.8	946.8	t	129
4.21	4.26	4.32	4.37	4.42	4.47	4.52	4.57	4.83	5.08	5.33	5.57	6.05	6.53	v	
1261.2	1266.2	1271.2	1276.2	1281.2	1286.1	1291.1	1296.0	1320.3	1344.6	1368.8	1393.0	1441.4	1489.9	h	
1.6624	1.6677	1.6730	1.6782	1.6833	1.6883	1.6933	1.6982	1.7219	1.7444	1.7657	1.7861	1.8247	1.8605	n	
477.4	487.4	497.4	507.4	517.4	527.4	537.4	547.4	597.4	647.4	697.4	747.4	847.4	947.4	t	130
4.18	4.23	4.28	4.34	4.39	4.44	4.49	4.54	4.80	5.05	5.29	5.53	6.01	6.49	v	
1261.4	1266.4	1271.4	1276.4	1281.4	1286.3	1291.3	1296.2	1320.6	1344.9	1369.1	1393.3	1441.7	1490.2	h	
1.6619	1.6672	1.6724	1.6776	1.6827	1.6877	1.6927	1.6976	1.7213	1.7437	1.7651	1.7855	1.8241	1.8598	n	
478.0	488.0	498.0	508.0	518.0	528.0	538.0	548.0	598.0	648.0	698.0	748.0	848.0	948.0	t	131
4.15	4.20	4.25	4.31	4.36	4.41	4.46	4.51	4.76	5.01	5.25	5.49	5.97	6.44	v	
1261.6	1266.6	1271.6	1276.6	1281.6	1286.5	1291.5	1296.4	1320.8	1345.1	1369.3	1393.5	1441.9	1490.4	h	
1.6613	1.6666	1.6718	1.6770	1.6821	1.6871	1.6921	1.6970	1.7207	1.7431	1.7645	1.7849	1.8234	1.8591	n	
478.5	488.5	498.5	508.5	518.5	528.5	538.5	548.5	598.5	648.5	698.5	748.5	848.5	948.5	t	132
4.12	4.17	4.22	4.28	4.33	4.38	4.43	4.48	4.73	4.98	5.22	5.45	5.93	6.40	v	
1261.8	1266.8	1271.8	1276.8	1281.8	1286.7	1291.7	1296.6	1321.0	1345.3	1369.5	1393.7	1442.1	1490.6	h	
1.6607	1.6660	1.6712	1.6764	1.6815	1.6865	1.6915	1.6964	1.7201	1.7425	1.7639	1.7842	1.8228	1.8584	n	
479.1	489.1	499.1	509.1	519.1	529.1	539.1	549.1	599.1	649.1	699.1	749.1	849.1	949.1	t	133
4.09	4.14	4.19	4.25	4.30	4.35	4.40	4.45	4.70	4.94	5.18	5.42	5.89	6.36	v	
1261.9	1266.9	1271.9	1276.9	1281.9	1286.9	1291.9	1296.8	1321.2	1345.5	1369.7	1393.9	1442.3	1490.8	h	
1.6601	1.6654	1.6706	1.6758	1.6809	1.6859	1.6909	1.6958	1.7195	1.7419	1.7632	1.7836	1.8221	1.8578	n	
479.7	489.7	499.7	509.7	519.7	529.7	539.7	549.7	599.7	649.7	699.7	749.7	849.7	949.7	t	134
4.06	4.11	4.16	4.22	4.27	4.32	4.37	4.42	4.66	4.90	5.14	5.38	5.84	6.31	v	
1262.1	1267.1	1272.1	1277.1	1282.1	1287.1	1292.1	1297.0	1321.4	1345.7	1369.9	1394.1	1442.5	1491.1	h	
1.6595	1.6649	1.6701	1.6752	1.6803	1.6853	1.6903	1.6952	1.7189	1.7413	1.7626	1.7830	1.8215	1.8572	n	
480.3	490.3	500.3	510.3	520.3	530.3	540.3	550.3	600.3	650.3	700.3	750.3	850.3	950.3	t	135
4.03	4.08	4.14	4.19	4.24	4.29	4.33	4.38	4.63	4.87	5.11	5.34	5.80	6.27	v	
1262.3	1267.3	1272.3	1277.3	1282.3	1287.3	1292.3	1297.2	1321.6	1345.9	1370.2	1394.4	1442.8	1491.3	h	
1.6589	1.6643	1.6695	1.6747	1.6798	1.6848	1.6897	1.6946	1.7183	1.7407	1.7620	1.7824	1.8209	1.8565	n	
480.8	490.8	500.8	510.8	520.8	530.8	540.8	550.8	600.8	650.8	700.8	750.8	850.8	950.8	t	136
4.01	4.06	4.11	4.16	4.21	4.26	4.30	4.35	4.60	4.84	5.08	5.31	5.76	6.22	v	
1262.5	1267.5	1272.5	1277.5	1282.5	1287.5	1292.5	1297.4	1321.8	1346.1	1370.4	1394.6	1443.0	1491.5	h	
1.6584	1.6637	1.6689	1.6741	1.6792	1.6842	1.6891	1.6940	1.7177	1.7401	1.7614	1.7817	1.8202	1.8559	n	
481.4	491.4	501.4	511.4	521.4	531.4	541.4	551.4	601.4	651.4	701.4	751.4	851.4	951.4	t	137
3.98	4.03	4.08	4.13	4.18	4.23	4.27	4.32	4.57	4.81	5.04	5.27	5.72	6.18	v	
1262.7	1267.7	1272.7	1277.7	1282.7	1287.7	1292.7	1297.6	1322.0	1346.3	1370.6	1394.8	1443.2	1491.8	h	
1.6578	1.6631	1.6683	1.6735	1.6786	1.6836	1.6885	1.6934	1.7171	1.7395	1.7608	1.7811	1.8196	1.8552	n	

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
138	t	352.0		362.0	372.0	382.0	392.0	402.0	412.0	422.0	432.0	442.0	452.0	462.0	472.0
	v	0.02	3.26	3.32	3.37	3.43	3.48	3.54	3.59	3.64	3.70	3.75	3.80	3.85	3.90
	h	323.4	1192.0	1198.1	1204.0	1209.8	1215.5	1221.1	1226.5	1231.9	1237.2	1242.4	1247.6	1252.7	1257.8
	n	0.5057	1.5759	1.5834	1.5906	1.5975	1.6042	1.6107	1.6170	1.6232	1.6292	1.6350	1.6407	1.6463	1.6518
139	t	352.5		362.5	372.5	382.5	392.5	402.5	412.5	422.5	432.5	442.5	452.5	462.5	472.5
	v	0.02	3.24	3.30	3.35	3.41	3.46	3.52	3.57	3.62	3.67	3.72	3.78	3.83	3.88
	h	324.0	1192.1	1198.2	1204.1	1210.0	1215.6	1221.2	1226.7	1232.1	1237.4	1242.6	1247.8	1252.9	1258.0
	n	0.5064	1.5753	1.5828	1.5900	1.5969	1.6036	1.6101	1.6164	1.6224	1.6285	1.6344	1.6401	1.6457	1.6512
140	t	353.1		363.1	373.1	383.1	393.1	403.1	413.1	423.1	433.1	443.1	453.1	463.1	473.1
	v	0.02	3.22	3.27	3.32	3.38	3.44	3.49	3.54	3.60	3.65	3.70	3.75	3.80	3.85
	h	324.6	1192.2	1198.3	1204.3	1210.1	1215.8	1221.4	1226.8	1232.2	1237.5	1242.8	1248.0	1253.1	1258.2
	n	0.5072	1.5747	1.5822	1.5894	1.5964	1.6031	1.6096	1.6159	1.6220	1.6280	1.6338	1.6395	1.6451	1.6506
141	t	353.6		363.6	373.6	383.6	393.6	403.6	413.6	423.6	433.6	443.6	453.6	463.6	473.6
	v	0.02	3.20	3.25	3.30	3.36	3.41	3.47	3.52	3.57	3.62	3.67	3.72	3.77	3.82
	h	325.2	1192.3	1198.4	1204.4	1210.2	1215.9	1221.5	1227.0	1232.4	1237.7	1242.9	1248.1	1253.3	1258.4
	n	0.5079	1.5741	1.5816	1.5888	1.5958	1.6025	1.6090	1.6153	1.6214	1.6274	1.6332	1.6389	1.6445	1.6500
142	t	354.2		364.2	374.2	384.2	394.2	404.2	414.2	424.2	434.2	444.2	454.2	464.2	474.2
	v	0.02	3.18	3.23	3.28	3.34	3.39	3.44	3.50	3.55	3.60	3.65	3.70	3.75	3.80
	h	325.8	1192.5	1198.6	1204.6	1210.4	1216.1	1221.7	1227.2	1232.6	1237.9	1243.1	1248.3	1253.5	1258.6
	n	0.5086	1.5735	1.5810	1.5882	1.5952	1.6019	1.6084	1.6147	1.6209	1.6269	1.6327	1.6384	1.6440	1.6495
143	t	354.7		364.7	374.7	384.7	394.7	404.7	414.7	424.7	434.7	444.7	454.7	464.7	474.7
	v	0.02	3.15	3.21	3.26	3.32	3.37	3.42	3.48	3.53	3.58	3.63	3.68	3.73	3.77
	h	326.3	1192.6	1198.7	1204.7	1210.6	1216.3	1221.9	1227.3	1232.7	1238.0	1243.3	1248.5	1253.6	1258.7
	n	0.5093	1.5730	1.5805	1.5877	1.5947	1.6014	1.6079	1.6142	1.6204	1.6264	1.6322	1.6379	1.6435	1.6490
144	t	355.3		365.3	375.3	385.3	395.3	405.3	415.3	425.3	435.3	445.3	455.3	465.3	475.3
	v	0.02	3.13	3.19	3.24	3.29	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75
	h	326.9	1192.7	1198.8	1204.8	1210.7	1216.4	1222.0	1227.5	1232.9	1238.2	1243.5	1248.7	1253.8	1258.9
	n	0.5100	1.5724	1.5799	1.5872	1.5942	1.6009	1.6074	1.6137	1.6199	1.6258	1.6316	1.6373	1.6429	1.6484
145	t	355.8		365.8	375.8	385.8	395.8	405.8	415.8	425.8	435.8	445.8	455.8	465.8	475.8
	v	0.02	3.12	3.17	3.22	3.27	3.32	3.38	3.43	3.48	3.53	3.58	3.63	3.68	3.72
	h	327.4	1192.8	1199.0	1205.0	1210.8	1216.5	1222.2	1227.7	1233.1	1238.4	1243.6	1248.8	1254.0	1259.1
	n	0.5107	1.5719	1.5794	1.5867	1.5937	1.6004	1.6069	1.6132	1.6194	1.6253	1.6311	1.6368	1.6424	1.6479
146	t	356.3		366.3	376.3	386.3	396.3	406.3	416.3	426.3	436.3	446.3	456.3	466.3	476.3
	v	0.02	3.09	3.14	3.19	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70
	h	328.0	1192.9	1199.1	1205.1	1211.0	1216.7	1222.3	1227.8	1233.2	1238.5	1243.8	1249.0	1254.2	1259.3
	n	0.5114	1.5713	1.5789	1.5861	1.5931	1.5999	1.6063	1.6126	1.6188	1.6248	1.6306	1.6363	1.6419	1.6473
147	t	356.9		366.9	376.9	386.9	396.9	406.9	416.9	426.9	436.9	446.9	456.9	466.9	476.9
	v	0.02	3.07	3.12	3.17	3.23	3.28	3.33	3.38	3.43	3.48	3.53	3.58	3.63	3.68
	h	328.6	1193.0	1199.2	1205.3	1211.2	1216.9	1222.5	1228.0	1233.4	1238.7	1244.0	1249.2	1254.3	1259.4
	n	0.5121	1.5708	1.5784	1.5856	1.5926	1.5994	1.6058	1.6121	1.6183	1.6243	1.6301	1.6358	1.6414	1.6468
148	t	357.4		367.4	377.4	387.4	397.4	407.4	417.4	427.4	437.4	447.4	457.4	467.4	477.4
	v	0.02	3.05	3.10	3.15	3.21	3.26	3.31	3.36	3.41	3.46	3.51	3.56	3.61	3.65
	h	329.1	1193.2	1199.4	1205.4	1211.3	1217.1	1222.7	1228.2	1233.6	1238.9	1244.1	1249.3	1254.5	1259.6
	n	0.5128	1.5702	1.5778	1.5850	1.5920	1.5988	1.6053	1.6116	1.6178	1.6237	1.6295	1.6352	1.6408	1.6463
149	t	357.9		367.9	377.9	387.9	397.9	407.9	417.9	427.9	437.9	447.9	457.9	467.9	477.9
	v	0.02	3.03	3.08	3.13	3.19	3.24	3.29	3.34	3.39	3.44	3.49	3.54	3.58	3.63
	h	329.7	1193.3	1199.5	1205.5	1211.4	1217.2	1222.9	1228.4	1233.7	1239.0	1244.3	1249.5	1254.7	1259.8
	n	0.5135	1.5697	1.5773	1.5845	1.5915	1.5983	1.6048	1.6111	1.6172	1.6232	1.6291	1.6348	1.6404	1.6458

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°. Internal energy
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B.t.u. [log = 2.89 071]. = total heat − 144 Apv.
h = total heat in B.t.u. A = 1/J = 1.286 × 10⁻³ B.t.u. per ft. lb. [3.10 929]. Values for saturated steam
n = entropy. 144 A = 0.1852 [log = 1.26 764]. are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
482.0	492.0	502.0	512.0	522.0	532.0	542.0	552.0	602.0	652.0	702.0	752.0	852.0	952.0	t 138
3.95	4.00	4.05	4.10	4.15	4.20	4.24	4.29	4.54	4.78	5.01	5.23	5.68	6.13	v
1262.9	1267.9	1272.9	1277.9	1282.9	1287.9	1292.9	1297.8	1322.2	1346.5	1370.8	1395.0	1443.4	1492.0	h
1.6572	1.6625	1.6677	1.6729	1.6780	1.6830	1.6879	1.6928	1.7164	1.7389	1.7601	1.7805	1.8190	1.8546	n
482.5	492.5	502.5	512.5	522.5	532.5	542.5	552.5	602.5	652.5	702.5	752.5	852.5	952.5	t 139
3.93	3.97	4.02	4.07	4.12	4.17	4.22	4.27	4.51	4.74	4.97	5.20	5.65	6.10	v
1263.1	1268.1	1273.1	1278.1	1283.1	1288.1	1293.0	1298.0	1322.4	1346.7	1371.0	1395.2	1443.6	1492.2	h
1.6566	1.6619	1.6671	1.6723	1.6774	1.6824	1.6873	1.6922	1.7158	1.7382	1.7595	1.7799	1.8183	1.8540	n
483.1	493.1	503.1	513.1	523.1	533.1	543.1	553.1	603.1	653.1	703.1	753.1	853.1	953.1	t 140
3.90	3.95	4.00	4.05	4.09	4.14	4.19	4.24	4.48	4.71	4.94	5.16	5.61	6.06	v
1263.3	1268.3	1273.3	1278.3	1283.3	1288.3	1293.2	1298.2	1322.6	1346.9	1371.2	1395.4	1443.8	1492.4	h
1.6560	1.6614	1.6666	1.6717	1.6768	1.6818	1.6867	1.6916	1.7152	1.7376	1.7589	1.7792	1.8177	1.8533	n
483.6	493.6	503.6	513.6	523.6	533.6	543.6	553.6	603.6	653.6	703.6	753.6	853.6	953.6	t 141
3.87	3.92	3.97	4.02	4.07	4.12	4.16	4.21	4.45	4.68	4.91	5.13	5.57	6.02	v
1263.5	1268.5	1273.5	1278.5	1283.5	1288.5	1293.4	1298.3	1322.8	1347.1	1371.4	1395.6	1444.0	1492.6	h
1.6554	1.6608	1.6660	1.6711	1.6762	1.6812	1.6862	1.6911	1.7146	1.7370	1.7583	1.7786	1.8170	1.8527	n
484.2	494.2	504.2	514.2	524.2	534.2	544.2	554.2	604.2	654.2	704.2	754.2	854.2	954.2	t 142
3.85	3.90	3.94	3.99	4.04	4.09	4.13	4.18	4.42	4.65	4.88	5.10	5.54	5.98	v
1263.7	1268.7	1273.7	1278.7	1283.7	1288.7	1293.6	1298.5	1323.0	1347.3	1371.6	1395.8	1444.3	1492.9	h
1.6549	1.6602	1.6654	1.6705	1.6756	1.6806	1.6856	1.6905	1.7140	1.7364	1.7577	1.7780	1.8164	1.8521	n
484.7	494.7	504.7	514.7	524.7	534.7	544.7	554.7	604.7	654.7	704.7	754.7	854.7	954.7	t 143
3.82	3.87	3.92	3.97	4.01	4.06	4.11	4.16	4.39	4.62	4.84	5.06	5.50	5.94	v
1263.8	1268.8	1273.8	1278.8	1283.8	1288.8	1293.8	1298.7	1323.2	1347.5	1371.8	1396.0	1444.5	1493.1	h
1.6544	1.6597	1.6649	1.6700	1.6751	1.6801	1.6851	1.6900	1.7135	1.7359	1.7571	1.7775	1.8159	1.8515	n
485.3	495.3	505.3	515.3	525.3	535.3	545.3	555.3	605.3	655.3	705.3	755.3	855.3	955.3	t 144
3.80	3.84	3.89	3.94	3.99	4.03	4.08	4.13	4.36	4.59	4.81	5.03	5.46	5.90	v
1264.0	1269.0	1274.0	1279.0	1284.0	1289.0	1294.0	1298.9	1323.4	1347.7	1372.0	1396.2	1444.7	1493.3	h
1.6538	1.6591	1.6643	1.6695	1.6746	1.6796	1.6845	1.6894	1.7129	1.7353	1.7565	1.7768	1.8152	1.8509	n
485.8	495.8	505.8	515.8	525.8	535.8	545.8	555.8	605.8	655.8	705.8	755.8	855.8	955.8	t 145
3.77	3.82	3.87	3.92	3.96	4.01	4.05	4.10	4.33	4.56	4.78	5.00	5.43	5.86	v
1264.2	1269.2	1274.2	1279.2	1284.2	1289.2	1294.2	1299.1	1323.6	1347.9	1372.2	1396.4	1444.9	1493.5	h
1.6533	1.6586	1.6638	1.6690	1.6741	1.6791	1.6840	1.6889	1.7124	1.7348	1.7560	1.7763	1.8147	1.8504	n
486.3	496.3	506.3	516.3	526.3	536.3	546.3	556.3	606.3	656.3	706.3	756.3	856.3	956.3	t 146
3.75	3.80	3.84	3.89	3.93	3.98	4.02	4.07	4.30	4.53	4.75	4.97	5.39	5.82	v
1264.4	1269.4	1274.4	1279.4	1284.4	1289.4	1294.3	1299.3	1323.8	1348.1	1372.4	1396.6	1445.1	1493.8	h
1.6527	1.6581	1.6633	1.6684	1.6735	1.6785	1.6834	1.6883	1.7118	1.7342	1.7554	1.7757	1.8141	1.8498	n
486.9	496.9	506.9	516.9	526.9	536.9	546.9	556.9	606.9	656.9	706.9	756.9	856.9	956.9	t 147
3.73	3.77	3.82	3.86	3.91	3.96	4.00	4.05	4.27	4.50	4.72	4.94	5.36	5.78	v
1264.5	1269.6	1274.6	1279.6	1284.6	1289.6	1294.5	1299.4	1323.9	1348.2	1372.5	1396.8	1445.3	1494.0	h
1.6522	1.6576	1.6628	1.6679	1.6730	1.6780	1.6829	1.6878	1.7113	1.7336	1.7549	1.7752	1.8135	1.8492	n
487.4	497.4	507.4	517.4	527.4	537.4	547.4	557.4	607.4	657.4	707.4	757.4	857.4	957.4	t 148
3.70	3.75	3.79	3.84	3.88	3.93	3.97	4.02	4.25	4.47	4.69	4.90	5.32	5.75	v
1264.7	1269.7	1274.7	1279.8	1284.8	1289.8	1294.7	1299.6	1324.0	1348.4	1372.7	1397.0	1445.5	1494.2	h
1.6517	1.6570	1.6622	1.6673	1.6724	1.6774	1.6823	1.6872	1.7107	1.7330	1.7542	1.7746	1.8129	1.8486	n
487.9	497.9	507.9	517.9	527.9	537.9	547.9	557.9	607.9	657.9	707.9	757.9	857.9	957.9	t 149
3.68	3.72	3.77	3.82	3.86	3.91	3.95	4.00	4.22	4.44	4.66	4.87	5.29	5.71	v
1264.9	1269.9	1274.9	1280.0	1285.0	1290.0	1294.9	1299.8	1324.2	1348.6	1372.9	1397.2	1445.7	1494.4	h
1.6512	1.6565	1.6617	1.6668	1.6719	1.6769	1.6818	1.6867	1.7102	1.7325	1.7537	1.7740	1.8124	1.8480	n

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
150	t	358.5		368.5	378.5	388.5	398.5	408.5	418.5	428.5	438.5	448.5	458.5	468.5	478.5
	v	0.02	3.01	3.06	3.11	3.17	3.22	3.27	3.32	3.37	3.42	3.46	3.51	3.56	3.61
	h	330.2	1193.4	1199.6	1205.7	1211.6	1217.3	1223.0	1228.5	1233.9	1239.2	1244.4	1249.6	1254.8	1259.9
	n	0.5142	1.5692	1.5768	1.5840	1.5910	1.5978	1.6043	1.6106	1.6168	1.6227	1.6286	1.6343	1.6399	1.6453
151	t	359.0		369.0	379.0	389.0	399.0	409.0	419.0	429.0	439.0	449.0	459.0	469.0	479.0
	v	0.02	2.99	3.04	3.09	3.15	3.20	3.25	3.30	3.35	3.40	3.44	3.49	3.54	3.59
	h	330.8	1193.5	1199.8	1205.8	1211.7	1217.5	1223.2	1228.7	1234.1	1239.4	1244.6	1249.8	1255.0	1260 1
	n	0.5148	1.5686	1.5762	1.5835	1.5905	1.5973	1.6038	1.6100	1.6162	1.6222	1.6280	1.6337	1.6393	1.6447
152	t	359.5		369.5	379.5	389.5	399.5	409.5	419.5	429 5	439.5	449.5	459.5	469.5	479.5
	v	0.02	2.97	3.02	3.07	3.13	3.18	3.23	3.28	3.33	3.38	3.42	3.47	3.52	3.56
	h	331.4	1193.6	1199.9	1206.0	1211.9	1217.6	1223.3	1228.8	1234.2	1239.6	1244.8	1250.0	1255.2	1260.3
	n	0.5155	1.5680	1.5756	1.5829	1.5899	1.5967	1.6032	1.6095	1.6157	1.6216	1.6274	1.6331	1.6387	1.6441
153	t	360.0		370.0	380.0	390 0	400.0	410 0	420.0	430.0	440.0	450.0	460.0	470 0	480.0
	v	0.02	2.96	3.01	3.06	3.11	3.16	3.21	3.26	3.31	3 35	3.40	3.45	3 50	3.54
	h	331.9	1193.7	1200.0	1206.1	1212.0	1217.8	1223.4	1228 9	1234.4	1239.7	1244.9	1250 1	1255.3	1260 4
	n	0.5162	1.5675	1.5751	1.5824	1.5894	1.5962	1.6027	1.6090	1.6152	1.6211	1.6269	1.6326	1.6383	1.6437
154	t	360.5		370.5	380.5	390.5	400.5	410.5	420.5	430 5	440.5	450.5	460.5	470.5	480.5
	v	0.02	2.94	2.99	3.04	3.09	3.14	3.19	3.24	3 29	3.33	3.38	3.43	3.48	3.52
	h	332.4	1193.8	1200.1	1206 2	1212 2	1218.0	1223 6	1229 1	1234 5	1239.8	1245.1	1250.3	1255.5	1260.6
	n	0.5169	1.5670	1.5746	1.5819	1.5889	1.5958	1.6023	1.6085	1.6147	1.6207	1.6265	1.6322	1.6378	1.6432
155	t	361.0		371.0	381.0	391.0	401.0	411.0	421.0	431 0	441.0	451.0	461.0	471.0	481.0
	v	0.02	2.92	2.97	3.02	3.07	3.12	3.17	3 22	3.27	3.31	3.36	3.41	3.46	3.50
	h	332.9	1194.0	1200.2	1206.4	1212.3	1218.0	1223 6	1229 2	1234.7	1240 0	1245.2	1250.5	1255.7	1260.8
	n	0.5175	1.5665	1.5741	1.5814	1.5884	1.5953	1 6018	1.6080	1.6142	1.6202	1.6260	1.6317	1.6373	1.6427
156	t	361.6		371.6	381.6	391 6	401.6	411.6	421.6	431.6	441.6	451.6	461.6	471.6	481.6
	v	0.02	2.90	2.95	3 00	3 05	3 10	3 15	3.20	3.25	3.29	3.34	3.39	3.43	3.48
	h	333.5	1194.1	1200.4	1206.5	1212.4	1218 2	1223.9	1229 4	1234.8	1240.2	1245.4	1250.6	1255.8	1260.9
	n	0.5182	1.5659	1.5736	1.5809	1.5879	1.5947	1.6012	1.6075	1.6137	1.6197	1.6255	1.6311	1.6367	1.6421
157	t	362.1		372.1	382.1	392.1	402.1	412.1	422 1	432.1	442 1	452 1	462.1	472.1	482.1
	v	0.02	2.88	2.93	2.98	3.03	3.08	3.13	3.18	3 23	3.27	3.32	3.37	3.41	3.46
	h	334.0	1194.2	1200.5	1206.6	1212.6	1218.4	1224.1	1229 6	1235.0	1240.3	1245.6	1250.8	1256.0	1261.1
	n	0.5188	1.5654	1.5731	1.5804	1.5874	1.5942	1.6008	1.6070	1.6132	1.6192	1.6250	1.6306	1.6361	1.6416
158	t	362.6		372.6	382.6	392 6	402.6	412.6	422 6	432 6	442.6	452.6	462 6	472 6	482.6
	v	0.02	2.87	2.92	2.97	3.02	3.07	3.11	3.16	3.21	3.25	3.30	3.35	3.39	3.44
	h	334.6	1194.3	1200.6	1206.8	1212.7	1218.5	1224.2	1229.7	1235.2	1240.5	1245.7	1250.9	1256.1	1261.2
	n	0.5195	1.5649	1.5725	1.5798	1.5869	1.5937	1.6002	1.6065	1.6127	1.6187	1.6245	1.6301	1.6357	1.6411
159	t	363.1		373.1	383.1	393.1	403.1	413.1	423.1	433.1	443.1	453.1	463.1	473.1	483.1
	v	0.02	2.85	2.90	2.95	3.00	3.05	3.09	3.14	3.19	3.23	3.28	3.33	3.37	3.42
	h	335.1	1194.4	1200.7	1206.9	1212.8	1218.6	1224.3	1229.8	1235.3	1240 6	1245.9	1251.1	1256 3	1261.4
	n	0.5201	1.5644	1.5721	1.5794	1.5865	1.5933	1.5998	1.6061	1.6122	1.6182	1.6240	1.6297	1.6353	1.6407
160	t	363.6		373.6	383.6	393.6	403.6	413.6	423.6	433.6	443.6	453.6	463.6	473.6	483.6
	v	0.02	2.83	2.88	2.93	2.98	3 03	3.07	3.12	3.17	3.21	3.26	3.30	3.35	3.40
	h	335.6	1194.5	1200.8	1207.0	1213.0	1218.8	1224.5	1230.0	1235.5	1240.8	1246.1	1251.3	1256.5	1261.6
	n	0.5208	1.5639	1.5716	1.5789	1.5860	1.5928	1.5993	1.6056	1.6118	1.6177	1.6235	1.6292	1.6348	1.6402
161	t	364.1		374.1	384.1	394.1	404.1	414.1	424.1	434.1	444.1	454.1	464.1	474.1	484.1
	v	0.02	2.82	2.87	2.91	2.96	3.01	3.06	3.11	3.15	3.20	3.24	3.29	3.33	3.38
	h	336.2	1194.6	1201.0	1207.1	1213.1	1218.9	1224.6	1230.1	1235.6	1240.9	1246.2	1251.5	1256.6	1261.7
	n	0.5214	1.5634	1.5711	1.5785	1.5855	1.5923	1.5989	1.6052	1.6113	1.6173	1.6231	1.6287	1.6342	1.6397
162	t	364.6		374.6	384.6	394.6	404.6	414.6	424.6	434.6	444.6	454.6	464.6	474.6	484.6
	v	0.02	2.80	2.85	2.90	2.95	3.00	3.04	3.09	3.13	3.18	3.22	3.27	3.31	3.36
	h	336.7	1194.7	1201.1	1207.3	1213.2	1219.0	1224.8	1230.3	1235.8	1241.1	1246.4	1251.6	1256.8	1261.9
	n	0.5220	1.5629	1.5706	1.5780	1.5850	1.5919	1.5984	1.6047	1.6108	1.6168	1.6226	1.6283	1.6339	1.6393

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
488.5	498.5	508.5	518.5	528.5	538.5	548.5	558.5	608.5	658.5	708.5	758.5	858.5	958.5	t 150
3.66	3.70	3.75	3.79	3.84	3.88	3.92	3.97	4.19	4.41	4.63	4.84	5.25	5.67	v
1265.0	1270.1	1275.1	1280.1	1285.1	1290.1	1295.0	1300.0	1324.5	1348.8	1373.1	1397.4	1445.9	1494.6	h
1.6507	1.6560	1.6612	1.6663	1.6714	1.6764	1.6813	1.6862	1.7097	1.7320	1.7532	1.7735	1.8118	1.8474	n
489.0	499.0	509.0	519.0	529.0	539.0	549.0	559.0	609.0	659.0	709.0	759.0	859.0	959.0	t 151
3.63	3.68	3.72	3.77	3.81	3.86	3.90	3.95	4.17	4.38	4.60	4.81	5.22	5.64	v
1265.2	1270.2	1275.2	1280.3	1285.3	1290.3	1295.2	1300.2	1324.7	1349.0	1373.3	1397.6	1446.1	1494.8	h
1.6501	1.6554	1.6606	1.6657	1.6708	1.6758	1.6807	1.6856	1.7091	1.7314	1.7526	1.7729	1.8112	1.8468	n
489.5	499.5	509.5	519.5	529.5	539.5	549.5	559.5	609.5	659.5	709.5	759.5	859.5	959.5	t 152
3.61	3.66	3.70	3.75	3.79	3.84	3.88	3.92	4.14	4.36	4.57	4.78	5.19	5.60	v
1265.4	1270.4	1275.4	1280.5	1285.5	1290.5	1295.4	1300.3	1324.8	1349.2	1373.5	1397.8	1446.3	1495.0	h
1.6496	1.6548	1.6600	1.6652	1.6703	1.6752	1.6801	1.6850	1.7085	1.7308	1.7520	1.7723	1.8106	1.8462	n
490.0	500.0	510.0	520.0	530.0	540.0	550.0	560.0	610.0	660.0	710.0	760.0	860.0	960.0	t 153
3.59	3.63	3.68	3.72	3.77	3.81	3.85	3.90	4.12	4.33	4.54	4.75	5.16	5.57	v
1265.5	1270.6	1275.6	1280.6	1285 6	1290.6	1295.5	1300.5	1325.0	1349.4	1373.7	1398.0	1446.5	1495.2	h
1.6491	1.6544	1.6596	1.6647	1.6698	1.6747	1.6796	1.6845	1.7080	1.7303	1.7514	1.7718	1.8100	1.8457	n
490.5	500.5	510.5	520.5	530.5	540.5	550.5	560.5	610.5	660.5	710.5	760.5	860.5	960.5	t 154
3.57	3.61	3.66	3.70	3.74	3.79	3.83	3.88	4.09	4.30	4.51	4.72	5.13	5.54	v
1265.7	1270.8	1275.8	1280.8	1285.8	1290.8	1295.7	1300.7	1325.2	1349.6	1373.8	1398.2	1446.7	1495.4	h
1.6486	1.6539	1.6591	1.6642	1.6693	1.6742	1.6791	1.6840	1.7075	1.7298	1.7509	1.7712	1.8095	1.8451	n
491.0	501.0	511.0	521.0	531.0	541.0	551.0	561.0	611.0	661.0	711.0	761.0	861.0	961.0	t 155
3.55	3.59	3.63	3.68	3.72	3.76	3.81	3.85	4.06	4.28	4.49	4.70	5.10	5.50	v
1265.9	1271.0	1276.0	1281.0	1286.0	1291.0	1295.9	1300 8	1325.3	1349.7	1374.0	1398.4	1446.9	1495.6	h
1.6481	1.6534	1.6586	1.6637	1.6688	1.6737	1.6786	1.6835	1.7070	1.7293	1.7504	1.7707	1.8090	1.8445	n
491.6	501.6	511.6	521.6	531.6	541.6	551.6	561.6	611.6	661.9	711.6	761.6	861.6	961.6	t 156
3.52	3.57	3.61	3.66	3.70	3.74	3.79	3.83	4.04	4.25	4.46	4.67	5.07	5.47	v
1266.0	1271.4	1276.1	1281.2	1286.2	1291.1	1296.0	1301.0	1325.5	1349.9	1374.2	1398.5	1447.1	1495.8	h
1.6475	1.6528	1.6580	1.6631	1.6682	1.6731	1.6781	1.6830	1.7064	1.7287	1.7498	1.7701	1.8084	1.8439	n
492.1	502.1	512.1	522.1	532.1	542.1	552.1	562.1	612.1	662.1	712.1	762.1	862.1	962.1	t 157
3.50	3.55	3.59	3.63	3.68	3.72	3.76	3.81	4.02	4.23	4.44	4.64	5.04	5.44	v
1266.2	1271.3	1276.3	1281.3	1286.3	1291.3	1296.2	1301.2	1325.7	1350.1	1374.4	1398.7	1447.3	1496.0	h
1.6470	1.6523	1.6575	1.6626	1.6676	1.6726	1.6776	1.6825	1.7059	1.7282	1.7493	1.7696	1.8078	1.8434	n
492.6	502.6	512.6	522.6	532.6	542.6	552.6	562.6	612.6	662.6	712.6	762.6	862.6	962.6	t 158
3.48	3.52	3.57	3.61	3.66	3.70	3.74	3.78	3.99	4.20	4.41	4.62	5.01	5.40	v
1266.3	1271.4	1276.4	1281.5	1286.5	1291.5	1296.4	1301.3	1325.9	1350.3	1374.6	1398.9	1447.5	1496.2	h
1.6464	1.6517	1.6569	1.6620	1.6671	1.6721	1.6770	1.6819	1.7053	1.7276	1.7487	1.7690	1.8072	1.8428	n
493.1	503.1	513.1	523.1	533.1	543.1	553.1	563.1	613.1	663.1	713.1	763.1	863.1	963.1	t 159
3.46	3.50	3.55	3.59	3.63	3.68	3.72	3.76	3.97	4.18	4.39	4.59	4.98	5.37	v
1266.5	1271.6	1276.6	1281.6	1286.6	1291.6	1296.6	1301.5	1326.0	1350.4	1374.8	1399.1	1447.7	1496.4	h
1.6460	1.6513	1.6565	1.6616	1.6667	1.6717	1.6766	1.6815	1.7048	1.7271	1.7483	1.7685	1.8068	1.8423	n
493.6	503.6	513.6	523.6	533.6	543.6	553.6	563.6	613.6	663.6	713.6	763.6	863.6	963.6	t 160
3.44	3.48	3.53	3.57	3.61	3.66	3.70	3.74	3.95	4.15	4.36	4.56	4.95	5.34	v
1266.7	1271.8	1276.8	1281.8	1286.8	1291.8	1296.8	1301.7	1326.2	1350.6	1375.0	1399.3	1447.9	1496.6	h
1.6456	1.6509	1.6561	1.6612	1.6662	1.6712	1.6761	1.6810	1.7043	1.7266	1.7477	1.7680	1.8063	1.8418	n
494.1	504.1	514.1	524.1	534.1	544.1	554.1	564.1	614.1	664.1	714.1	764.1	864.1	964.1	t 161
3.42	3.46	3.51	3.55	3.59	3.63	3.67	3.72	3.92	4.13	4.34	4.54	4.92	5.31	v
1266.8	1271.9	1276.9	1282.0	1287.0	1292.0	1296.9	1301.8	1326.4	1350.8	1375.1	1399.4	1448.1	1496.8	h
1.6451	1.6504	1.6556	1.6607	1.6657	1.6707	1.6756	1.6805	1.7038	1.7261	1.7472	1.7675	1.8057	1.8413	n
494.6	504.6	514.6	524.6	534.6	544.6	554.6	564.6	614.6	664.6	714.6	764.6	864.6	964.6	t 162
3.40	3.44	3.49	3.53	3.57	3.61	3.65	3.70	3.90	4.10	4.31	4.51	4.89	5.28	v
1267.0	1272.1	1277.1	1282.2	1287.2	1292.2	1297.1	1302.0	1326.6	1351.0	1375.3	1399.6	1448.3	1497.0	h
1.6446	1.6499	1.6551	1.6602	1.6652	1.6702	1.6751	1.6800	1.7033	1.7256	1.7467	1.7670	1.8052	1.8407	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
163	t		365.1	375.1	385.1	395.1	405.1	415.1	425.1	435.1	445.1	455.1	465.1	475.1	485.1
	v	0.02	2.78	2.83	2.88	2.93	2.98	3.02	3.07	3.11	3.16	3.20	3.25	3.29	3.34
	h	337.2	1194.8	1201.2	1207.4	1213.4	1219.2	1224.9	1230.4	1235.8	1241.2	1246.5	1251.7	1256.9	1262.0
	n	0.5226	1.5624	1.5701	1.5775	1.5846	1.5914	1.5979	1.6042	1.6104	1.6163	1.6221	1.6278	1.6334	1.6388
164	t		365.6	375.6	385.6	395.6	405.6	415.6	425.6	435.6	445.6	455.6	465.6	475.6	485.6
	v	0.02	2.77	2.82	2.87	2.91	2.96	3.01	3.05	3.10	3.14	3.19	3.23	3.28	3.32
	h	337.7	1194.9	1201.3	1207.5	1213.5	1219.3	1225.1	1230.6	1236.0	1241.4	1246.7	1251.9	1257.1	1262.2
	n	0.5233	1.5620	1.5697	1.5771	1.5842	1.5910	1.5975	1.6038	1.6100	1.6160	1.6218	1.6275	1.6330	1.6384
165	t		366.0	376.0	386.0	396.0	406.0	416.0	426.0	436.0	446.0	456.0	466.0	476.0	486.0
	v	0.02	2.75	2.80	2.85	2.90	2.94	2.99	3.04	3.08	3.12	3.17	3.21	3.26	3.30
	h	338.2	1195.0	1201.4	1207.6	1213.6	1219.5	1225.2	1230.7	1236.1	1241.5	1246.8	1252.0	1257.2	1262.3
	n	0.5239	1.5615	1.5692	1.5766	1.5837	1.5905	1.5970	1.6033	1.6095	1.6155	1.6212	1.6269	1.6325	1.6379
166	t		366.5	376.5	386.5	396.5	406.5	416.5	426.5	436.5	446.5	456.5	466.5	476.5	486.5
	v	0.02	2.74	2.79	2.84	2.88	2.93	2.97	3.02	3.06	3.11	3.15	3.19	3.24	3.28
	h	338.7	1195.1	1201.5	1207.8	1213.8	1219.6	1225.3	1230.9	1236.4	1241.7	1247.0	1252.2	1257.4	1262.5
	n	0.5245	1.5610	1.5688	1.5762	1.5832	1.5901	1.5966	1.6029	1.6091	1.6150	1.6208	1.6265	1.6321	1.6375
167	t		367.0	377.0	387.0	397.0	407.0	417.0	427.0	437.0	447.0	457.0	467.0	477.0	487.0
	v	0.02	2.72	2.77	2.81	2.86	2.91	2.96	3.00	3.04	3.09	3.13	3.18	3.22	3.26
	h	339.2	1195.2	1201.6	1207.9	1213.9	1219.7	1225.5	1231.0	1236.5	1241.8	1247.1	1252.4	1257.6	1262.7
	n	0.5251	1.5605	1.5683	1.5757	1.5828	1.5896	1.5962	1.6025	1.6086	1.6146	1.6203	1.6260	1.6316	1.6370
168	t		367.5	377.5	387.5	397.5	407.5	417.5	427.5	437.5	447.5	457.5	467.5	477.5	487.5
	v	0.02	2.71	2.76	2.81	2.85	2.89	2.94	2.98	3.03	3.07	3.12	3.16	3.20	3.24
	h	339.7	1195.3	1201.7	1208.0	1214.0	1219.9	1225.6	1231.2	1236.7	1242.0	1247.3	1252.5	1257.7	1262.8
	n	0.5257	1.5600	1.5678	1.5752	1.5823	1.5891	1.5957	1.6020	1.6081	1.6141	1.6199	1.6255	1.6310	1.6365
169	t		368.0	378.0	388.0	398.0	408.0	418.0	428.0	438.0	448.0	458.0	468.0	478.0	488.0
	v	0.02	2.69	2.74	2.78	2.83	2.88	2.92	2.97	3.01	3.06	3.10	3.14	3.19	3.23
	h	340.2	1195.4	1201.8	1208.1	1214.1	1220.0	1225.7	1231.3	1236.8	1242.1	1247.4	1252.7	1257.9	1263.0
	n	0.5263	1.5595	1.5673	1.5747	1.5818	1.5887	1.5952	1.6015	1.6076	1.6136	1.6194	1.6251	1.6307	1.6361
170	t		368.5	378.5	388.5	398.5	408.5	418.5	428.5	438.5	448.5	458.5	468.5	478.5	488.5
	v	0.02	2.68	2.73	2.78	2.82	2.86	2.91	2.95	3.00	3.04	3.08	3.12	3.17	3.21
	h	340.7	1195.4	1202.0	1208.2	1214.3	1220.2	1225.9	1231.5	1237.0	1242.3	1247.6	1252.8	1258.0	1263.1
	n	0.5269	1.5590	1.5668	1.5742	1.5814	1.5882	1.5947	1.6010	1.6071	1.6131	1.6189	1.6246	1.6302	1.6356
171	t		368.9	378.9	388.9	398.9	408.9	418.9	428.9	438.9	448.9	458.9	468.9	478.9	488.9
	v	0.02	2.66	2.71	2.76	2.80	2.84	2.89	2.93	2.98	3.02	3.06	3.10	3.15	3.19
	h	341.2	1195.5	1202.1	1208.3	1214.4	1220.3	1226.0	1231.6	1237.1	1242.4	1247.7	1253.0	1258.2	1263.3
	n	0.5275	1.5586	1.5664	1.5739	1.5810	1.5878	1.5944	1.6007	1.6068	1.6127	1.6185	1.6242	1.6298	1.6352
172	t		369.4	379.4	389.4	399.4	409.4	419.4	429.4	439.4	449.4	459.4	469.4	479.4	489.4
	v	0.02	2.64	2.69	2.74	2.78	2.83	2.88	2.92	2.96	3.00	3.05	3.09	3.13	3.17
	h	341.7	1195.6	1202.2	1208.5	1214.5	1220.4	1226.2	1231.8	1237.2	1242.6	1247.9	1253.2	1258.3	1263.4
	n	0.5281	1.5581	1.5659	1.5734	1.5805	1.5873	1.5939	1.6002	1.6063	1.6123	1.6181	1.6237	1.6293	1.6347
173	t		369.9	379.9	389.9	399.9	409.9	419.9	429.9	439.9	449.9	459.9	469.9	479.9	489.9
	v	0.02	2.63	2.68	2.72	2.77	2.82	2.86	2.90	2.95	2.99	3.03	3.07	3.12	3.16
	h	342.2	1195.7	1202.3	1208.6	1214.6	1220.5	1226.3	1231.9	1237.4	1242.7	1248.0	1253.3	1258.5	1263.6
	n	0.5287	1.5576	1.5655	1.5729	1.5800	1.5869	1.5934	1.5997	1.6059	1.6118	1.6176	1.6233	1.6288	1.6342
174	t		370.4	380.4	390.4	400.4	410.4	420.4	430.4	440.4	450.4	460.4	470.4	480.4	490.4
	v	0.02	2.62	2.67	2.72	2.76	2.80	2.84	2.89	2.93	2.97	3.01	3.06	3.10	3.14
	h	342.7	1195.8	1202.4	1208.7	1214.8	1220.7	1226.4	1232.0	1237.5	1242.9	1248.2	1253.4	1258.6	1263.7
	n	0.5293	1.5571	1.5650	1.5724	1.5795	1.5864	1.5930	1.5993	1.6054	1.6113	1.6171	1.6228	1.6284	1.6337.

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = 1.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.	
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		
495.1	505.1	515.1	525.1	535.1	545.1	555.1	565.1	615.1	665.1	715.1	765.1	865.1	965.1	t	163
3.38	3.42	3.47	3.51	3.55	3.59	3.63	3.68	3.88	4.08	4.29	4.49	4.86	5.25	v	
1267.1	1272.2	1277.2	1282.3	1287.3	1292.3	1297.2	1302.2	1326.8	1351.1	1375.5	1399.8	1448.4	1497.2	h	
1.6441	1.6494	1.6546	1.6597	1.6647	1.6697	1.6746	1.6795	1.7028	1.7251	1.7462	1.7665	1.8047	1.8402	n	
495.6	505.6	515.6	525.6	535.6	545.6	555.6	565.6	615.6	665.6	715.6	765.6	865.6	965.6	t	164
3.36	3.41	3.45	3.49	3.53	3.57	3.61	3.66	3.86	4.06	4.26	4.46	4.83	5.22	v	
1267.3	1272.4	1277.4	1282.4	1287.4	1292.4	1297.4	1302.4	1327.0	1351.3	1375.7	1400.0	1448.6	1497.4	h	
1.6437	1.6490	1.6542	1.6593	1.6643	1.6693	1.6742	1.6791	1.7024	1.7247	1.7458	1.7660	1.8042	1.8398	n	
496.0	506.0	516.0	526.0	536.0	546.0	556.0	566.0	616.0	666.0	716.0	766.0	866.0	966.0	t	165
3.35	3.39	3.43	3.47	3.51	3.55	3.59	3.64	3.84	4.04	4.24	4.44	4.81	5.19	v	
1267.4	1272.5	1277.6	1282.6	1287.6	1292.6	1297.6	1302.5	1327.1	1351.5	1375.8	1400.1	1448.8	1497.6	h	
1.6433	1.6486	1.6537	1.6588	1.6638	1.6688	1.6737	1.6786	1.7019	1.7242	1.7453	1.7655	1.8037	1.8393	n	
496.5	506.5	516.5	526.5	536.5	546.5	556.5	566.5	616.5	666.5	716.5	766.5	866.5	966.5	t	166
3.33	3.37	3.41	3.45	3.49	3.53	3.57	3.62	3.81	4.01	4.21	4.41	4.78	5.16	v	
1267.6	1272.7	1277.8	1282.8	1287.8	1292.8	1297.7	1302.7	1327.3	1351.6	1376.0	1400.3	1449.0	1497.8	h	
1.6428	1.6480	1.6532	1.6583	1.6634	1.6684	1.6733	1.6782	1.7014	1.7237	1.7448	1.7650	1.8032	1.8387	n	
497.0	507.0	517.0	527.0	537.0	547.0	557.0	567.0	617.0	667.0	717.0	767.0	867.0	967.0	t	167
3.31	3.35	3.39	3.43	3.47	3.51	3.55	3.60	3.79	3.99	4.19	4.39	4.75	5.13	v	
1267.8	1272.9	1277.9	1283.0	1288.0	1293.0	1297.9	1302.8	1327.4	1351.8	1376.2	1400.5	1449.1	1498.0	h	
1.6423	1.6476	1.6528	1.6579	1.6629	1.6679	1.6728	1.6777	1.7009	1.7232	1.7443	1.7645	1.8027	1.8382	n	
497.5	507.5	517.5	527.5	537.5	547.5	557.5	567.5	617.5	667.5	717.5	767.5	867.5	967.5	t	168
3.29	3.33	3.37	3.41	3.45	3.49	3.53	3.58	3.77	3.97	4.17	4.36	4.73	5.10	v	
1267.9	1273.0	1278.1	1283.1	1288.1	1293.1	1298.1	1303.0	1327.6	1352.0	1376.3	1400.7	1449.3	1498.2	h	
1.6419	1.6471	1.6523	1.6574	1.6624	1.6674	1.6723	1.6772	1.7004	1.7227	1.7438	1.7640	1.8021	1.8377	n	
498.0	508.0	518.0	528.0	538.0	548.0	558.0	568.0	618.0	668.0	718.0	768.0	868.0	968.0	t	169
3.27	3.31	3.35	3.39	3.43	3.47	3.51	3.56	3.75	3.95	4.15	4.34	4.70	5.07	v	
1268.1	1273.2	1278.2	1283.2	1288.2	1293.2	1298.2	1303.2	1327.8	1352.2	1376.5	1400.8	1499.5	1498.4	h	
1.6414	1.6466	1.6518	1.6569	1.6619	1.6669	1.6718	1.6767	1.6999	1.7222	1.7433	1.7635	1.8016	1.8371	n	
498.5	508.5	518.5	528.5	538.5	548.5	558.5	568.5	618.5	668.5	718.5	768.5	868.5	968.5	t	170
3.25	3.29	3.34	3.38	3.42	3.46	3.50	3.54	3.73	3.92	4.12	4.31	4.67	5.04	v	
1268.2	1273.3	1278.4	1283.4	1288.4	1293.4	1298.4	1303.3	1327.9	1352.3	1376.7	1401.0	1449.7	1498.6	h	
1.6409	1.6461	1.6513	1.6564	1.6614	1.6664	1.6713	1.6762	1.6994	1.7217	1.7427	1.7630	1.8011	1.8366	n	
498.9	508.9	518.9	528.9	538.9	548.9	558.9	568.9	618.9	668.9	718.9	768.9	868.9	968.9	t	171
3.23	3.27	3.32	3.36	3.40	3.44	3.48	3.52	3.71	3.90	4.10	4.29	4.65	5.02	v	
1268.4	1273.5	1278.5	1283.6	1288.6	1293.6	1298.5	1303.4	1328.1	1352.5	1376.8	1401.2	1449.8	1498.7	h	
1.6405	1.6457	1.6509	1.6560	1.6610	1.6660	1.6709	1.6758	1.6990	1.7213	1.7423	1.7625	1.8007	1.8362	n	
499.4	509.4	519.4	529.4	539.4	549.4	559.4	569.4	619.4	669.4	719.4	769.4	869.4	969.4	t	172
3.22	3.26	3.30	3.34	3.38	3.42	3.46	3.50	3.69	3.88	4.08	4.26	4.62	4.99	v	
1268.5	1273.6	1278.7	1283.7	1288.7	1293.7	1298.7	1303.6	1328.2	1352.7	1377.0	1401.4	1450.0	1498.9	h	
1.6400	1.6452	1.6504	1.6555	1.6605	1.6655	1.6704	1.6753	1.6985	1.7208	1.7418	1.7620	1.8002	1.8357	n	
499.9	509.9	519.9	529.9	539.9	549.9	559.9	569.9	619.9	669.9	719.9	769.9	869.9	969.9	t	173
3.20	3.24	3.28	3.32	3.36	3.40	3.44	3.48	3.67	3.86	4.05	4.24	4.60	4.96	v	
1268.7	1273.8	1278.8	1283.9	1288.9	1293.9	1298.8	1303.8	1328.4	1352.8	1377.2	1401.6	1450.2	1499.1	h	
1.6395	1.6448	1.6500	1.6551	1.6601	1.6650	1.6699	1.6748	1.6980	1.7203	1.7413	1.7615	1.7996	1.8351	n	
500.4	510.4	520.4	530.4	540.4	550.4	560.4	570.4	620.4	670.4	720.4	770.4	870.4	970.4	t	174
3.18	3.22	3.26	3.30	3.34	3.38	3.42	3.46	3.65	3.84	4.03	4.22	4.58	4.93	v	
1268.8	1273.9	1279.0	1284.0	1289.0	1294.0	1299.0	1303.9	1328.6	1353.0	1377.3	1401.7	1450.4	1499.3	h	
1.6390	1.6443	1.6495	1.6546	1.6596	1.6645	1.6694	1.6743	1.6975	1.7197	1.7408	1.7610	1.7991	1.8346	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3. Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
175	t	370.8		380.8	390.8	400.8	410.8	420.8	430.8	440.8	450.8	460.8	470.8	480.8	490.8
	v	0.02	2.60	2.65	2.69	2.74	2.78	2.83	2.87	2.91	2.96	3.00	3.04	3.08	3.12
	h	343.2	1195.9	1202.5	1208.8	1214.9	1220.8	1226.6	1232.2	1237.7	1243.0	1248.3	1253.6	1258.8	1263.9
	n	0.5299	1.5567	1.5646	1.5720	1.5792	1.5860	1.5926	1.5989	1.6051	1.6110	1.6168	1.6224	1.6280	1.6334
176	t	371.3		381.3	391.3	401.3	411.3	421.3	431.3	441.3	451.3	461.3	471.3	481.3	491.3
	v	0.02	2.59	2.64	2.68	2.72	2.77	2.81	2.86	2.90	2.94	2.98	3.02	3.07	3.11
	h	343.7	1196.0	1202.6	1208.9	1215.0	1221.0	1226.7	1232.3	1237.8	1243.2	1248.5	1253.7	1258.9	1264.0
	n	0.5305	1.5562	1.5641	1.5715	1.5787	1.5856	1.5921	1.5984	1.6046	1.6105	1.6163	1.6220	1.6275	1.6329
177	t	371.7		381.7	391.7	401.7	411.7	421.7	431.7	441.7	451.7	461.7	471.7	481.7	491.7
	v	0.02	2.57	2.62	2.66	2.71	2.75	2.80	2.84	2.88	2.92	2.97	3.01	3.05	3.09
	h	344.2	1196.1	1202.7	1209.0	1215.2	1221.1	1226.8	1232.4	1237.9	1243.3	1248.6	1253.9	1259.1	1264.2
	n	0.5311	1.5557	1.5636	1.5711	1.5782	1.5851	1.5916	1.5979	1.6041	1.6101	1.6159	1.6215	1.6270	1.6324
178	t	372.2		382.2	392.2	402.2	412.2	422.2	432.2	442.2	452.2	462.2	472.2	482.2	492.2
	v	0.02	2.56	2.61	2.65	2.69	2.74	2.78	2.83	2.87	2.91	2.95	2.99	3.03	3.07
	h	344.7	1196.2	1202.8	1209.2	1215.3	1221.2	1227.0	1232.6	1238.1	1243.5	1248.8	1254.0	1259.2	1264.3
	n	0.5317	1.5552	1.5631	1.5706	1.5778	1.5846	1.5912	1.5975	1.6037	1.6096	1.6154	1.6211	1.6266	1.6320
179	t	372.7		382.7	392.7	402.7	412.7	422.7	432.7	442.7	452.7	462.7	472.7	482.7	492.7
	v	0.02	2.55	2.59	2.63	2.68	2.72	2.77	2.81	2.85	2.89	2.94	2.98	3.02	3.06
	h	345.2	1196.3	1202.9	1209.3	1215.4	1221.3	1227.1	1232.7	1238.2	1243.6	1248.9	1254.2	1259.4	1264.5
	n	0.5322	1.5547	1.5626	1.5701	1.5773	1.5841	1.5907	1.5970	1.6032	1.6091	1.6149	1.6206	1.6261	1.6315
180	t	373.1		383.1	393.1	403.1	413.1	423.1	433.1	443.1	453.1	463.1	473.1	483.1	493.1
	v	0.02	2.53	2.58	2.62	2.67	2.71	2.75	2.80	2.84	2.88	2.92	2.96	3.00	3.04
	h	345.6	1196.4	1203.0	1209.4	1215.5	1221.5	1227.2	1232.8	1238.4	1243.8	1249.1	1254.3	1259.5	1264.6
	n	0.5328	1.5543	1.5622	1.5697	1.5769	1.5838	1.5904	1.5967	1.6028	1.6088	1.6145	1.6201	1.6257	1.6311
181	t	373.6		383.6	393.6	403.6	413.6	423.6	433.6	443.6	453.6	463.6	473.6	483.6	493.6
	v	0.02	2.52	2.57	2.61	2.65	2.70	2.74	2.78	2.82	2.86	2.91	2.95	2.99	3.03
	h	346.1	1196.5	1203.1	1209.5	1215.6	1221.6	1227.4	1233.0	1238.5	1243.9	1249.2	1254.5	1259.7	1264.8
	n	0.5334	1.5539	1.5619	1.5693	1.5765	1.5834	1.5900	1.5963	1.6025	1.6084	1.6141	1.6198	1.6253	1.6307
182	t	374.0		384.0	394.0	404.0	414.0	424.0	434.0	444.0	454.0	464.0	474.0	484.0	494.0
	v	0.02	2.51	2.55	2.59	2.64	2.68	2.72	2.77	2.81	2.85	2.89	2.93	2.97	3.01
	h	346.6	1196.6	1203.2	1209.6	1215.8	1221.7	1227.5	1233.1	1238.6	1244.0	1249.3	1254.6	1259.8	1264.9
	n	0.5339	1.5534	1.5614	1.5689	1.5761	1.5829	1.5895	1.5958	1.6020	1.6079	1.6137	1.6194	1.6249	1.6303
183	t	374.5		384.5	394.5	404.5	414.5	424.5	434.5	444.5	454.5	464.5	474.5	484.5	494.5
	v	0.02	2.49	2.54	2.58	2.63	2.67	2.71	2.75	2.79	2.84	2.88	2.92	2.96	2.99
	h	347.1	1196.7	1203.3	1209.7	1215.9	1221.9	1227.7	1233.3	1238.8	1244.2	1249.5	1254.7	1259.9	1265.1
	n	0.5345	1.5530	1.5610	1.5685	1.5757	1.5826	1.5892	1.5955	1.6016	1.6076	1.6133	1.6189	1.6244	1.6298
184	t	374.9		384.9	394.9	404.9	414.9	424.9	434.9	444.9	454.9	464.9	474.9	484.9	494.9
	v	0.02	2.48	2.52	2.56	2.61	2.66	2.70	2.74	2.78	2.82	2.86	2.90	2.94	2.98
	h	347.6	1196.8	1203.4	1209.8	1216.0	1222.0	1227.8	1233.4	1238.9	1244.3	1249.6	1254.9	1260.1	1265.2
	n	0.5351	1.5525	1.5605	1.5680	1.5752	1.5821	1.5887	1.5950	1.6011	1.6071	1.6129	1.6185	1.6240	1.6294
185	t	375.4		385.4	395.4	405.4	415.4	425.4	435.4	445.4	455.4	465.4	475.4	485.4	495.4
	v	0.02	2.47	2.51	2.55	2.60	2.64	2.68	2.72	2.76	2.81	2.85	2.89	2.93	2.97
	h	348.0	1196.8	1203.5	1210.0	1216.1	1222.1	1227.9	1233.5	1239.0	1244.4	1249.7	1255.0	1260.2	1265.3
	n	0.5356	1.5520	1.5600	1.5675	1.5748	1.5816	1.5882	1.5945	1.6007	1.6066	1.6124	1.6180	1.6235	1.6289
186	t	375.8		385.8	395.8	405.8	415.8	425.8	435.8	445.8	455.8	465.8	475.8	485.8	495.8
	v	0.02	2.46	2.50	2.54	2.58	2.63	2.67	2.71	2.75	2.79	2.83	2.87	2.91	2.95
	h	348.5	1196.9	1203.6	1210.1	1216.3	1222.2	1228.0	1233.7	1239.2	1244.6	1249.9	1255.2	1260.4	1265.5
	n	0.5362	1.5516	1.5596	1.5671	1.5744	1.5813	1.5879	1.5942	1.6003	1.6063	1.6120	1.6176	1.6231	1.6285
187	t	376.3		386.3	396.3	406.3	416.3	426.3	436.3	446.3	456.3	466.3	476.3	486.3	496.3
	v	0.02	2.44	2.49	2.53	2.57	2.61	2.66	2.70	2.74	2.78	2.82	2.86	2.90	2.93
	h	349.0	1197.0	1203.7	1210.2	1216.4	1222.3	1228.1	1233.8	1239.3	1244.7	1250.0	1255.3	1260.5	1265.6
	n	0.5367	1.5511	1.5591	1.5666	1.5739	1.5808	1.5874	1.5937	1.5998	1.6058	1.6116	1.6172	1.6227	1.6281

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
500.8	510.8	520.8	530.8	540.8	550.8	560.8	570.8	620.8	670.8	720.8	770.8	870.8	970.8	t 175
3.16	3.20	3.24	3.28	3.32	3.36	3.40	3 44	3.63	3.82	4.01	4.20	4.55	4.91	v
1269.0	1274.1	1279.1	1284.2	1289.2	1294.2	1299.1	1304.1	1328.7	1353.2	1377.5	1401.9	1450.5	1499.5	h
1.6387	1.6439	1.6491	1.6542	1.6592	1.6642	1.6691	1.6740	1.6971	1.7193	1.7404	1.7606	1.7987	1.8342	n
501.3	511.3	521.3	531.3	541.3	551.3	561.3	571.3	621.3	671.3	721.3	771.3	871.3	971.3	t 176
3.15	3.19	3.23	3.27	3.31	3.35	3.38	3.42	3.61	3.80	3.99	4.17	4.53	4.88	v
1269.1	1274.2	1279.3	1284.3	1289.3	1294.3	1299.3	1304.2	1328.9	1353.3	1377.7	1402.1	1450.7	1499.6	h
1.6382	1.6434	1.6486	1.6537	1.6587	1.6637	1.6686	1.6735	1.6967	1.7188	1.7399	1.7601	1.7982	1.8336	n
501.7	511.7	521.7	531.7	541.7	551.7	561.7	571.7	621.7	671.7	721.7	771.7	871.7	971.7	t 177
3.13	3.17	3.21	3.25	3.29	3.33	3.37	3.41	3.60	3.78	3.97	4.15	4.51	4.86	v
1269.3	1274.4	1279.4	1284.5	1289.5	1294.5	1299.4	1304.4	1329.0	1353.5	1377.8	1402.2	1450.9	1499.8	h
1.6377	1.6429	1.6481	1.6532	1.6582	1.6632	1.6681	1.6730	1.6962	1.7183	1.7394	1.7596	1.7977	1.8331	n
502.2	512.2	522.2	532.2	542.2	552.2	562.2	572.2	622.2	672.2	722.2	772.2	872.2	972.2	t 178
3.11	3.15	3.19	3.23	3.27	3.31	3.35	3.39	3.58	3.76	3.95	4.13	4.48	4.83	v
1269.4	1274.5	1279.6	1284.6	1289.6	1294.6	1299.6	1304.5	1329.2	1353.6	1378.0	1402.4	1451.0	1500.0	h
1.6373	1.6425	1.6476	1.6527	1.6577	1.6627	1.6676	1.6725	1.6957	1.7178	1.7389	1.7590	1.7971	1.8326	n
502.7	512.7	522.7	532.7	542.7	552.7	562.7	572.7	622.7	672.7	722.7	772.7	872.7	972.7	t 179
3.10	3.14	3.18	3.22	3.26	3.29	3.33	3.37	3.56	3.74	3.93	4.11	4.46	4.81	v
1269.6	1274.7	1279.7	1284.8	1289.8	1294.8	1299.7	1304.7	1329.3	1353.8	1378.2	1402.6	1451.2	1500.2	h
1.6368	1.6420	1.6472	1.6523	1.6573	1.6622	1.6671	1.6720	1.6952	1.7173	1.7384	1.7585	1.7966	1.8320	n
503.1	513.1	523.1	533.1	543.1	553.1	563.1	573.1	623.1	673.1	723.1	773.1	873.1	973.1	t 180
3.08	3.12	3.16	3.20	3.24	3.28	3.32	3.35	3.54	3.72	3.91	4.09	4.44	4.78	v
1269.7	1274.8	1279.9	1284.9	1289.9	1294.9	1299.9	1304.8	1329.5	1353.9	1378.3	1402.7	1451.4	1500.3	h
1.6364	1.6416	1.6468	1.6519	1.6569	1.6618	1.6667	1.6716	1.6948	1.7169	1.7380	1.7581	1.7962	1.8316	n
503.6	513.6	523.6	533.6	543.6	553.6	563.6	573.6	623.6	673.6	723.6	773.6	873.6	973.6	t 181
3.07	3.11	3.14	3.18	3.22	3.26	3.30	3.34	3.52	3.71	3.89	4.07	4.42	4.76	v
1269.9	1275.0	1280.0	1285.1	1290.1	1295.1	1300.0	1305.0	1329.6	1354.1	1378.5	1402.9	1451.6	1500.5	h
1.6360	1.6412	1.6464	1.6515	1.6565	1.6614	1.6663	1.6712	1.6944	1.7165	1.7375	1.7577	1.7958	1.8312	n
504.0	514.0	524.0	534.0	544.0	554.0	564.0	574.0	624.0	674.0	724.0	774.0	874.0	974.0	t 182
3.05	3.09	3.13	3.17	3.20	3.24	3.28	3.32	3.51	3.69	3.87	4.04	4.40	4.74	v
1270.0	1275.1	1280.2	1285.2	1290.2	1295.2	1300.2	1305.1	1329.8	1354.2	1378.6	1403.0	1451.7	1500.7	h
1.6356	1.6408	1.6459	1.6510	1.6560	1.6609	1.6658	1.6707	1.6939	1.7160	1.7370	1.7572	1.7953	1.8307	n
504.5	514.5	524.5	534.5	544.5	554.5	564.5	574.5	624.5	674.5	724.5	774.5	874.5	974.5	t 183
3.03	3.07	3.11	3.15	3.19	3.23	3.26	3.30	3.49	3.67	3.85	4.02	4.37	4.71	v
1270.2	1275.3	1280.3	1285.4	1290.4	1295.4	1300.3	1305.3	1329.9	1354.4	1378.8	1403.2	1451.9	1500.9	h
1.6352	1.6404	1.6455	1.6506	1.6556	1.6605	1.6654	1.6703	1.6935	1.7156	1.7366	1.7568	1.7948	1.8302	n
504.9	514.9	524.9	534.9	544.9	554.9	564.9	574.9	624.9	674.9	724.9	774.9	874.9	974.9	t 184
3.02	3.06	3.10	3.13	3.17	3.21	3.25	3.29	3.47	3.65	3.83	4.00	4.35	4.69	v
1270.3	1275.4	1280.4	1285.5	1290.5	1295.5	1300.5	1305.4	1330.0	1354.6	1379.0	1403.4	1452.1	1501.1	h
1.6347	1.6400	1.6451	1.6501	1.6551	1.6601	1.6650	1.6699	1.6930	1.7151	1.7361	1.7563	1.7943	1.8297	n
505.4	515.4	525.4	535.4	545.4	555.4	565.4	575.4	625.4	675.4	725.4	775.4	875.4	975.4	t 185
3.01	3.04	3.08	3.12	3.16	3.19	3.23	3.27	3.45	3.63	3.81	3.98	4.33	4.67	v
1270.5	1275.6	1280.6	1285.7	1290.7	1295.7	1300.6	1305.6	1330.2	1354.7	1379.1	1403.5	1452.2	1501.2	h
1.6342	1.6394	1.6446	1.6497	1.6547	1.6596	1.6645	1.6694	1.6925	1.7146	1.7356	1.7558	1.7938	1.8292	n
505.8	515.8	525.8	535.8	545.8	555.8	565.8	575.8	625.8	675.8	725.8	775.8	875.8	975.8	t 186
2.99	3.03	3.07	3.10	3.14	3.18	3.22	3.25	3.44	3.62	3.79	3.96	4.31	4.64	v
1270.6	1275.7	1280.7	1285.8	1290.8	1295.8	1300.8	1305.7	1330.3	1354.9	1379.3	1403.7	1452.4	1501.4	h
1.6339	1.6391	1.6442	1.6493	1.6543	1.6592	1.6641	1.6690	1.6921	1.7142	1.7352	1.7554	1.7934	1.8288	n
506.3	516.3	526.3	536.3	546.3	556.3	566.3	576.3	626.3	676.3	726.3	776.3	876.3	976.3	t 187
2.97	3.01	3.05	3.09	3.13	3.16	3.20	3.24	3.42	3.60	3.77	3.94	4.29	4.62	v
1270.7	1275.8	1280.9	1286.0	1291.0	1296.0	1300.9	1305.8	1330.5	1355.0	1379.4	1403.8	1452.6	1501.6	h
1.6334	1.6386	1.6437	1.6488	1.6538	1.6587	1.6636	1.6685	1.6916	1.7137	1.7347	1.7549	1.7929	1.8282	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
188	**t**	376.7		386.7	396.7	406.7	416.7	426.7	436.7	446.7	456.7	466.7	476.7	486.7	496.7
	v	0.02	2.43	2.47	2.51	2.56	2.60	2.64	2.68	2.72	2.76	2.80	2.84	2.88	2.92
	h	349.4	1197.1	1203.8	1210.3	1216.5	1222.5	1228.3	1234.0	1239.5	1244.9	1250.2	1255.5	1260.7	1265.8
	n	0.5373	1.5507	1.5587	1.5663	1.5735	1.5804	1.5870	1.5934	1.5995	1.6054	1.6111	1.6168	1.6223	1.6277
189	**t**	377.2		387.2	397.2	407.2	417.2	427.2	437.2	447.2	457.2	467.2	477.2	487.2	497.2
	v	0.02	2.42	2.46	2.50	2.55	2.59	2.63	2.67	2.71	2.75	2.79	2.83	2.87	2.91
	h	349.9	1197.2	1203.9	1210.4	1216.6	1222.6	1228.4	1234.1	1239.6	1245.0	1250.3	1255.6	1260.8	1265.9
	n	0.5378	1.5502	1.5582	1.5658	1.5731	1.5800	1.5866	1.5929	1.5990	1.6050	1.6107	1.6163	1.6218	1.6272
190	**t**	377.6		387.6	397.6	407.6	417.6	427.6	437.6	447.6	457.6	467.6	477.6	487.6	497.6
	v	0.02	2.41	2.45	2.49	2.53	2.58	2.62	2.66	2.70	2.74	2.78	2.81	2.85	2.89
	h	350.4	1197.3	1204.0	1210.5	1216.7	1222.7	1228.6	1234.3	1239.8	1245.1	1250.4	1255.7	1260.9	1266.1
	n	0.5384	1.5498	1.5579	1.5654	1.5727	1.5796	1.5862	1.5925	1.5986	1.6046	1.6103	1.6159	1.6214	1.6268
191	**t**	378.0		388.0	398.0	408.0	418.0	428.0	438.0	448.0	458.0	468.0	478.0	488.0	498.0
	v	0.02	2.39	2.43	2.48	2.52	2.56	2.60	2.64	2.68	2.72	2.76	2.80	2.84	2.88
	h	350.8	1197.3	1204.1	1210.6	1216.8	1222.8	1228.7	1234.4	1239.9	1245.3	1250.6	1255.8	1261.0	1266.2
	n	0.5389	1.5494	1.5575	1.5650	1.5723	1.5792	1.5858	1.5921	1.5983	1.6042	1.6100	1.6156	1.6211	1.6265
192	**t**	378.5		388.5	398.5	408.5	418.5	428.5	438.5	448.5	458.5	468.5	478.5	488.5	498.5
	v	0.02	2.38	2.42	2.46	2.51	2.55	2.59	2.63	2.67	2.71	2.75	2.79	2.83	2.86
	h	351.3	1197.4	1204.2	1210.7	1217.0	1223.0	1228.8	1234.5	1240.0	1245.4	1250.7	1256.0	1261.2	1266.3
	n	0.5395	1.5490	1.5571	1.5646	1.5719	1.5789	1.5855	1.5918	1.5979	1.6038	1.6096	1.6152	1.6207	1.6261
193	**t**	378.9		388.9	398.9	408.9	418.9	428.9	438.9	448.9	458.9	468.9	478.9	488.9	498.9
	v	0.02	2.37	2.41	2.45	2.49	2.54	2.58	2.62	2.66	2.70	2.73	2.77	2.81	2.85
	h	351.7	1197.5	1204.3	1210.8	1217.1	1223.1	1228.9	1234.6	1240.2	1245.6	1250.9	1256.1	1261.3	1266.4
	n	0.5400	1.5485	1.5566	1.5642	1.5715	1.5784	1.5850	1.5913	1.5974	1.6034	1.6092	1.6148	1.6203	1.6256
194	**t**	379.3		389.3	399.3	409.3	419.3	429.3	439.3	449.3	459.3	469.3	479.3	489.3	499.3
	v	0.02	2.36	2.40	2.44	2.48	2.52	2.56	2.60	2.64	2.68	2.72	2.76	2.80	2.84
	h	352.2	1197.6	1204.4	1211.0	1217.2	1223.2	1229.0	1234.7	1240.3	1245.7	1251.0	1256.3	1261.5	1266.6
	n	0.5405	1.5481	1.5562	1.5638	1.5711	1.5780	1.5846	1.5909	1.5971	1.6030	1.6088	1.6144	1.6199	1.6253
195	**t**	379.8		389.8	399.8	409.8	419.8	429.8	439.8	449.8	459.8	469.8	479.8	489.8	499.8
	v	0.02	2.35	2.39	2.43	2.47	2.51	2.55	2.59	2.63	2.67	2.71	2.75	2.78	2.82
	h	352.7	1197.7	1204.5	1211.1	1217.3	1223.3	1229.2	1234.9	1240.4	1245.8	1251.1	1256.4	1261.6	1266.7
	n	0.5410	1.5476	1.5557	1.5633	1.5706	1.5776	1.5842	1.5905	1.5966	1.6025	1.6083	1.6139	1.6194	1.6248
196	**t**	380.2		390.2	400.2	410.2	420.2	430.2	440.2	450.2	460.2	470.2	480.2	490.2	500.2
	v	0.02	2.34	2.38	2.42	2.46	2.50	2.54	2.58	2.62	2.66	2.70	2.73	2.77	2.81
	h	353.1	1197.8	1204.6	1211.2	1217.4	1223.4	1229.3	1235.0	1240.6	1246.0	1251.3	1256.5	1261.7	1266.8
	n	0.5416	1.5472	1.5553	1.5629	1.5702	1.5772	1.5838	1.5901	1.5962	1.6022	1.6079	1.6135	1.6190	1.6244
197	**t**	380.6		390.6	400.6	410.6	420.6	430.6	440.6	450.6	460.6	470.6	480.6	490.6	500.6
	v	0.02	2.32	2.36	2.40	2.45	2.49	2.53	2.57	2.61	2.64	2.68	2.72	2.76	2.79
	h	353.6	1197.8	1204.7	1211.3	1217.5	1223.6	1229.4	1235.1	1240.7	1246.1	1251.4	1256.7	1261.9	1267.0
	n	0.5421	1.5468	1.5549	1.5626	1.5699	1.5768	1.5834	1.5897	1.5958	1.6018	1.6076	1.6132	1.6187	1.6240
198	**t**	381.0		391.0	401.0	411.0	421.0	431.0	441.0	451.0	461.0	471.0	481.0	491.0	501.0
	v	0.02	2.31	2.35	2.39	2.44	2.48	2.52	2.56	2.59	2.63	2.67	2.71	2.74	2.78
	h	354.0	1197.9	1204.8	1211.4	1217.6	1223.7	1229.6	1235.3	1240.8	1246.2	1251.5	1256.8	1262.0	1267.1
	n	0.5426	1.5464	1.5546	1.5622	1.5695	1.5765	1.5831	1.5894	1.5955	1.6014	1.6072	1.6128	1.6183	1.6237
199	**t**	381.4		391.4	401.4	411.4	421.4	431.4	441.4	451.4	461.4	471.4	481.4	491.4	501.4
	v	0.02	2.30	2.34	2.38	2.42	2.46	2.50	2.54	2.58	2.62	2.66	2.69	2.73	2.77
	h	354.4	1198.0	1204.9	1211.5	1217.7	1223.8	1229.7	1235.4	1240.9	1246.3	1251.6	1256.9	1262.1	1267.2
	n	0.5431	1.5460	1.5542	1.5618	1.5691	1.5761	1.5827	1.5890	1.5951	1.6011	1.6068	1.6124	1.6179	1.6233

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = 1.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat														Press. lbs.	
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		
506.7	516.7	526.7	536.7	546.7	556.7	566.7	576.7	626.7	676.7	726.7	776.7	876.7	976.7	t	188
2.96	3.00	3.04	3.07	3.11	3.15	3.18	3.22	3.40	3.58	3.75	3.92	4.26	4.60	v	
1270.9	1276.0	1281.0	1286.1	1291.1	1296.1	1301.0	1306.0	1330.6	1355.1	1379.6	1404.0	1452.7	1501.7	h	
1.6330	1.6382	1.6433	1.6484	1.6534	1.6583	1.6632	1.6681	1.6912	1.7133	1.7343	1.7544	1.7924	1.8278	n	
507.2	517.2	527.2	537.2	547.2	557.2	567.2	577.2	627.2	677.2	727.2	777.2	877.2	977.2	t	189
2.95	2.98	3.02	3.06	3.10	3.13	3.17	3.20	3.38	3.56	3.73	3.91	4.24	4.58	v	
1271.0	1276.1	1281.2	1286.2	1291.2	1296.2	1301.2	1306.1	1330.8	1355.3	1379.7	1404.2	1452.9	1501.9	h	
1.6325	1.6378	1.6429	1.6479	1.6529	1.6578	1.6627	1.6676	1.6907	1.7128	1.7338	1.7539	1.7919	1.8273	n	
507.6	517.6	527.6	537.6	547.6	557.6	567.6	577.6	627.6	677.6	727.6	777.6	877.6	977.6	t	190
2.93	2.97	3.00	3.04	3.08	3.12	3.15	3.19	3.37	3.55	3.72	3.89	4.22	4.55	v	
1271.2	1276.3	1281.3	1286.4	1291.4	1296.4	1301.3	1306.3	1330.9	1355.5	1379.9	1404.3	1453.1	1502.1	h	
1.6322	1.6374	1.6425	1.6475	1.6525	1.6574	1.6623	1.6672	1.6904	1.7124	1.7334	1.7535	1.7915	1.8269	n	
508.0	518.0	528.0	538.0	548.0	558.0	568.0	578.0	628.0	678.0	728.0	778.0	878.0	978.0	t	191
2.92	2.95	2.99	3.03	3.06	3.10	3.14	3.17	3.35	3.53	3.70	3.87	4.20	4.53	v	
1271.3	1276.4	1281.4	1286.5	1291.5	1296.5	1301.5	1306.4	1331.1	1355.6	1380.0	1404.5	1453.2	1502.2	h	
1.6318	1.6370	1.6421	1.6472	1.6522	1.6571	1.6619	1.6668	1.6900	1.7120	1.7330	1.7531	1.7911	1.8265	n	
508.5	518.5	528.5	538.5	548.5	558.5	568.5	578.5	628.5	678.5	728.5	778.5	878.5	978.5	t	192
2.90	2.94	2.98	3.01	3.05	3.09	3.12	3.16	3.34	3.51	3.68	3.85	4.18	4.51	v	
1271.5	1276.6	1281.6	1286.7	1291.7	1296.7	1301.6	1306.6	1331.2	1355.8	1380.2	1404.6	1453.4	1502.4	h	
1.6314	1.6366	1.6417	1.6468	1.6518	1.6567	1.6616	1.6665	1.6896	1.7116	1.7326	1.7527	1.7907	1.8260	n	
508.9	518.9	528.9	538.9	548.9	558.9	568.9	578.9	628.9	678.9	728.9	778.9	878.9	978.9	t	193
2.89	2.92	2.96	3.00	3.04	3.07	3.11	3.14	3.32	3.49	3.66	3.83	4.16	4.49	v	
1271.6	1276.7	1281.7	1286.8	1291.8	1296.8	1301.8	1306.7	1331.4	1355.9	1380.3	1404.8	1453.6	1502.6	h	
1.6309	1.6361	1.6412	1.6463	1.6513	1.6562	1.6611	1.6660	1.6891	1.7111	1.7321	1.7522	1.7902	1.8255	n	
509.3	519.3	529.3	539.3	549.3	559.3	569.3	579.3	629.3	679.3	729.3	779.3	879.3	979.3	t	194
2.88	2.91	2.95	2.98	3.02	3.06	3.09	3.13	3.31	3.48	3.64	3.81	4.14	4.47	v	
1271.7	1276.8	1281.8	1286.9	1291.9	1296.9	1301.9	1306.8	1331.5	1356.1	1380.5	1404.9	1453.7	1502.7	h	
1.6306	1.6358	1.6409	1.6459	1.6509	1.6558	1.6607	1.6656	1.6887	1.7107	1.7317	1.7518	1.7897	1.8251	n	
509.8	519.8	529.8	539.8	549.8	559.8	569.8	579.8	629.8	679.8	729.8	779.8	879.8	979.8	t	195
2.86	2.90	2.93	2.97	3.01	3.04	3.08	3.11	3.29	3.46	3.63	3.80	4.12	4.44	v	
1271.9	1277.0	1282.0	1287.1	1292.1	1297.1	1302.0	1307.0	1331.6	1356.2	1380.6	1415.1	1453.9	1502.9	h	
1.6301	1.6353	1.6404	1.6454	1.6504	1.6553	1.6602	1.6652	1.6882	1.7102	1.7312	1.7513	1.7892	1.8246	n	
510.2	520.2	530.2	540.2	550.2	560.2	570.2	580.2	630.2	680.2	730.2	780.2	880.2	980.2	t	196
2.85	2.88	2.92	2.95	2.99	3.03	3.06	3.10	3.28	3.45	3.61	3.78	4.11	4.42	v	
1272.0	1277.1	1282.1	1287.2	1292.2	1297.2	1302.2	1307.1	1331.8	1356.4	1380.8	1405.2	1454.0	1503.0	h	
1.6297	1.6349	1.6400	1.6450	1.6500	1.6549	1.6598	1.6647	1.6878	1.7098	1.7308	1.7509	1.7888	1.8242	n	
510.6	520.6	530.6	540.6	550.6	560.6	570.6	580.6	630.6	680.6	730.6	780.6	880.6	980.6	t	197
2.83	2.87	2.90	2.94	2.98	3.01	3.05	3.08	3.26	3.43	3.59	3.76	4.09	4.40	v	
1272.1	1277.2	1282.2	1287.3	1292.4	1297.4	1302.3	1307.2	1331.9	1356.5	1381.0	1405.4	1454.2	1503.2	h	
1.6293	1.6345	1.6396	1.6446	1.6496	1.6545	1.6594	1.6643	1.6874	1.7094	1.7304	1.7505	1.7884	1.8237	n	
511.0	521.0	531.0	541.0	551.0	561.0	571.0	581.0	631.0	681.0	731.0	781.0	881.0	981.0	t	198
2.82	2.85	2.89	2.93	2.96	3.00	3.03	3.07	3.24	3.41	3.58	3.74	4.07	4.38	v	
1272.3	1277.4	1282.4	1287.5	1292.5	1297.5	1302.4	1307.3	1332.1	1356.7	1381.1	1405.6	1454.4	1503.4	h	
1.6290	1.6342	1.6393	1.6443	1.6493	1.6542	1.6591	1.6640	1.6870	1.7090	1.7300	1.7501	1.7880	1.8233	n	
511.4	521.4	531.4	541.4	551.4	561.4	571.4	581.4	631.4	681.4	731.4	781.4	881.4	981.4	t	199
2.81	2.84	2.88	2.91	2.95	2.98	3.02	3.06	3.23	3.40	3.56	3.72	4.05	4.36	v	
1272.4	1277.5	1282.5	1287.6	1292.6	1297.6	1302.6	1307.5	1332.2	1356.8	1381.3	1405.7	1454.5	1503.5	h	
1.6286	1.6338	1.6389	1.6439	1.6489	1.6538	1.6587	1.6636	1.6866	1.7086	1.7296	1.7497	1.7876	1.8229	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
200	t	381.9		391.9	401.9	411.9	421.9	431.9	441.9	451.9	461.9	471.9	481.9	491.9	501.9
	v	0.02	2.29	2.33	2.37	2.41	2.45	2.49	2.53	2.57	2.61	2.64	2.68	2.72	2.76
	h	354.9	1198.1	1205.0	1211.6	1217.8	1223.9	1229.8	1235.5	1241.1	1246.5	1251.8	1257.1	1262.3	1267.4
	n	0.5437	1.5456	1.5538	1.5614	1.5687	1.5757	1.5823	1.5886	1.5947	1.6007	1.6064	1.6120	1.6175	1.6229
201	t	382.3		392.3	402.3	412.3	422.3	432.3	442.3	452.3	462.3	472.3	482.3	492.3	502.3
	v	0.02	2.28	2.32	2.36	2.40	2.44	2.48	2.52	2.56	2.59	2.63	2.67	2.71	2.74
	h	355.3	1198.2	1205.1	1211.7	1218.0	1224.0	1229.9	1235.6	1241.2	1246.6	1251.9	1257.2	1262.4	1267.5
	n	0.5442	1.5452	1.5534	1.5610	1.5683	1.5753	1.5820	1.5883	1.5944	1.6003	1.6061	1.6117	1.6172	1.6225
202	t	382.7		392.7	402.7	412.7	422.7	432.7	442.7	452.7	462.7	472.7	482.7	492.7	502.7
	v	0.02	2.27	2.31	2.35	2.39	2.43	2.47	2.51	2.55	2.58	2.62	2.66	2.70	2.73
	h	355.8	1198.2	1205.2	1211.8	1218.1	1224.1	1230.0	1235.7	1241.3	1246.7	1252.0	1257.3	1262.5	1267.6
	n	0.5447	1.5448	1.5530	1.5607	1.5680	1.5750	1.5816	1.5879	1.5940	1.6000	1.6057	1.6113	1.6168	1.6221
203	t	383.1		393.1	403.1	413.1	423.1	433.1	443.1	453.1	463.1	473.1	483.1	493.1	503.1
	v	0.02	2.26	2.30	2.34	2.38	2.42	2.46	2.50	2.53	2.57	2.61	2.64	2.68	2.72
	h	356.2	1198.3	1205.3	1211.9	1218.2	1224.2	1230.1	1235.8	1241.4	1246.8	1252.2	1257.5	1262.7	1267.8
	n	0.5452	1.5444	1.5526	1.5603	1.5676	1.5746	1.5812	1.5875	1.5936	1.5996	1.6053	1.6109	1.6164	1.6218
204	t	383.5		393.5	403.5	413.5	423.5	433.5	443.5	453.5	463.5	473.5	483.5	493.5	503.5
	v	0.02	2.25	2.29	2.33	2.37	2.41	2.45	2.48	2.52	2.56	2.60	2.63	2.67	2.70
	h	356.7	1198.4	1205.4	1212.0	1218.3	1224.4	1230.3	1236.0	1241.6	1247.0	1252.3	1257.6	1262.8	1267.9
	n	0.5458	1.5440	1.5522	1.5599	1.5672	1.5742	1.5809	1.5872	1.5933	1.5992	1.6050	1.6106	1.6161	1.6214
205	t	384.0		394.0	404.0	414.0	424.0	434.0	444.0	454.0	464.0	474.0	484.0	494.0	504.0
	v	0.02	2.24	2.28	2.32	2.36	2.40	2.44	2.47	2.51	2.55	2.58	2.62	2.66	2.69
	h	357.1	1198.5	1205.4	1212.1	1218.4	1224.5	1230.4	1236.1	1241.7	1247.1	1252.4	1257.7	1262.9	1268.0
	n	0.5463	1.5436	1.5518	1.5595	1.5669	1.5739	1.5805	1.5868	1.5929	1.5988	1.6046	1.6102	1.6157	1.6210
206	t	384.4		394.4	404.4	414.4	424.4	434.4	444.4	454.4	464.4	474.4	484.4	494.4	504.4
	v	0.02	2.23	2.27	2.31	2.35	2.38	2.42	2.46	2.50	2.54	2.57	2.61	2.64	2.68
	h	357.5	1198.5	1205.5	1212.2	1218.5	1224.6	1230.5	1236.2	1241.8	1247.2	1252.5	1257.8	1263.0	1268.2
	n	0.5468	1.5432	1.5514	1.5591	1.5665	1.5735	1.5801	1.5864	1.5925	1.5984	1.6042	1.6098	1.6153	1.6206
207	t	384.8		394.8	404.8	414.8	424.8	434.8	444.8	454.8	464.8	474.8	484.8	494.8	504.8
	v	0.02	2.22	2.26	2.29	2.33	2.37	2.41	2.45	2.49	2.52	2.56	2.60	2.63	2.67
	h	358.0	1198.6	1205.6	1212.3	1218.6	1224.7	1230.6	1236.3	1241.9	1247.3	1252.7	1258.0	1263.2	1268.3
	n	0.5473	1.5428	1.5511	1.5588	1.5662	1.5731	1.5798	1.5861	1.5922	1.5981	1.6038	1.6094	1.6150	1.6203
208	t	385.2		395.2	405.2	415.2	425.2	435.2	445.2	455.2	465.2	475.2	485.2	495.2	505.2
	v	0.02	2.21	2.25	2.28	2.32	2.36	2.40	2.44	2.48	2.51	2.55	2.58	2.62	2.66
	h	358.4	1198.7	1205.7	1212.4	1218.7	1224.8	1230.7	1236.4	1242.0	1247.4	1252.8	1258.1	1263.3	1268.4
	n	0.5478	1.5424	1.5507	1.5584	1.5658	1.5728	1.5794	1.5857	1.5918	1.5977	1.6035	1.6091	1.6146	1.6199
209	t	385.6		395.6	405.6	415.6	425.6	435.6	445.6	455.6	465.6	475.6	485.6	495.6	505.6
	v	0.02	2.20	2.24	2.27	2.31	2.35	2.39	2.43	2.46	2.50	2.54	2.57	2.61	2.64
	h	358.8	1198.8	1205.8	1212.5	1218.8	1224.9	1230.9	1236.6	1242.2	1247.6	1252.9	1258.2	1263.4	1268.6
	n	0.5483	1.5420	1.5503	1.5580	1.5654	1.5724	1.5790	1.5853	1.5914	1.5974	1.6031	1.6087	1.6142	1.6195
210	t	386.0		396.0	406.0	416.0	426.0	436.0	446.0	456.0	466.0	476.0	486.0	496.0	506.0
	v	0.02	2.19	2.23	2.26	2.30	2.34	2.38	2.42	2.45	2.49	2.53	2.56	2.60	2.63
	h	359.2	1198.8	1205.9	1212.6	1219.0	1225.1	1231.0	1236.7	1242.3	1247.7	1253.1	1258.4	1263.6	1268.7
	n	0.5488	1.5416	1.5499	1.5576	1.5650	1.5720	1.5787	1.5850	1.5911	1.5970	1.6028	1.6084	1.6138	1.6191
211	t	386.4		396.4	406.4	416.4	426.4	436.4	446.4	456.4	466.4	476.4	486.4	496.4	506.4
	v	0.02	2.18	2.22	2.25	2.29	2.33	2.37	2.41	2.44	2.48	2.52	2.55	2.59	2.62
	h	359.6	1198.9	1206.0	1212.7	1219.1	1225.2	1231.1	1236.8	1242.4	1247.8	1253.2	1258.5	1263.7	1268.8
	n	0.5493	1.5413	1.5496	1.5573	1.5647	1.5718	1.5784	1.5847	1.5908	1.5967	1.6025	1.6081	1.6136	1.6189
212	t	386.8		396.8	406.8	416.8	426.8	436.8	446.8	456.8	466.8	476.8	486.8	496.8	506.8
	v	0.02	2.17	2.21	2.24	2.28	2.32	2.36	2.40	2.43	2.47	2.50	2.54	2.58	2.61
	h	360.1	1199.0	1206.1	1212.8	1219.2	1225.3	1231.2	1237.0	1242.6	1248.0	1253.3	1258.6	1263.8	1268.9
	n	0.5498	1.5409	1.5492	1.5570	1.5644	1.5714	1.5780	1.5843	1.5904	1.5964	1.6021	1.6077	1.6132	1.6185

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
511.9	521.9	531.9	541.9	551.9	561.9	571.9	581.9	631.9	681.9	731.9	781.9	881.9	981.9	t 200
2.79	2.83	2.86	2.90	2.94	2.97	3.00	3.04	3.21	3.38	3.54	3.71	4.03	4.34	v
1272.5	1277.6	1282.6	1287.7	1292.8	1297.8	1302.7	1307.7	1332.4	1357.0	1381.4	1405.9	1454.7	1503.7	h
1.6282	1.6334	1.6385	1.6435	1.6485	1.6534	1.6583	1.6632	1.6862	1.7082	1.7291	1.7493	1.7872	1.8225	n
512.3	522.3	532.3	542.3	552.3	562.3	572.3	582.3	632.3	682.3	732.3	782.3	882.3	982.3	t 201
2.78	2.81	2.85	2.88	2.92	2.96	2.99	3.03	3.20	3.37	3.53	3.69	4.01	4.32	v
1272.6	1277.7	1282.8	1287.8	1292.9	1297.9	1302.8	1307.8	1332.5	1357.1	1381.6	1406.0	1454.8	1503.9	h
1.6278	1.6330	1.6381	1.6431	1.6481	1.6530	1.6579	1.6628	1.6858	1.7078	1.7287	1.7488	1.7867	1.8221	n
512.7	522.7	532.7	542.7	552.7	562.7	572.7	582.7	632.7	682.7	732.7	782.7	882.7	982.7	t 202
2.77	2.80	2.84	2.87	2.91	2.94	2.98	3.01	3.18	3.35	3.51	3.67	3.99	4.30	v
1272.8	1277.9	1282.9	1288.0	1293.0	1298.0	1303.0	1307.9	1332.6	1357.2	1381.7	1406.2	1455.0	1504.0	h
1.6274	1.6326	1.6377	1.6427	1.6477	1.6526	1.6575	1.6624	1.6854	1.7074	1.7283	1.7484	1.7863	1.8216	n
513.1	523.1	533.1	543.1	553.1	563.1	573.1	583.1	633.1	683.1	733.1	783 1	883.1	983.1	t 203
2.76	2.79	2.82	2.86	2.90	2.93	2.96	3.00	3.17	3.34	3.50	3.66	3.97	4.28	v
1272.9	1278.0	1283.1	1288.2	1293.2	1298.2	1303.1	1308.1	1332.8	1357.4	1381.9	1406.3	1455.2	1504.2	h
1.6271	1.6323	1.6374	1.6424	1.6474	1.6523	1.6571	1.6620	1.6850	1.7070	1.7279	1.7480	1.7859	1.8212	n
513.5	523.5	533.5	543.5	553.5	563.5	573.5	583.5	633.5	683.5	733.5	783.5	883.5	983.5	t 204
2.74	2.78	2.81	2.85	2.88	2.92	2.95	2.98	3.15	3.32	3.48	3.64	3.95	4.26	v
1273.0	1278.1	1283.2	1288.3	1293.3	1298.3	1303.2	1308.2	1332.9	1357.5	1382.0	1406.5	1455.3	1504.4	h
1.6267	1.6319	1.6370	1.6420	1.6470	1.6519	1.6567	1.6616	1.6846	1.7066	1.7275	1.7476	1.7855	1.8208	n
514.0	524.0	534.0	544.0	554.0	564.0	574.0	584.0	634.0	684.0	734.0	784.0	884.0	984.0	t 205
2.73	2.76	2.80	2.83	2.87	2.90	2.94	2.97	3.14	3.30	3.46	3.62	3.93	4.24	v
1273.2	1278.3	1283.3	1288.4	1293.4	1298.4	1303.3	1308.3	1333.0	1357.7	1382.1	1406.6	1455.5	1504.6	h
1.6263	1.6315	1.6366	1.6416	1.6466	1.6515	1.6564	1.6613	1.6842	1.7062	1.7271	1.7472	1.7851	1.8204	n
514.4	524.4	534.4	544.4	554.4	564.4	574.4	584.4	634.4	684.4	734.4	784.4	884.4	984.4	t 206
2.72	2.75	2.79	2.82	2.86	2.89	2.92	2.96	3.13	3.29	3.45	3.61	3.92	4.22	v
1273.3	1278.4	1283.5	1288.6	1293.6	1298.6	1303.5	1308.5	1333.2	1357.8	1382.3	1406.8	1455.6	1504.7	h
1.6259	1.6311	1.6362	1.6412	1.6462	1.6511	1.6560	1.6609	1.6838	1.7058	1.7267	1.7468	1.7847	1.8200	n
514.8	524.8	534.8	544.8	554.8	564.8	574.8	584.8	634.8	684.8	734.8	784.8	884.8	984.8	t 207
2.70	2.74	2.77	2.81	2.84	2.88	2.91	2.94	3.11	3.27	3.43	3.59	3.90	4.21	v
1273.4	1278.5	1283.6	1288.7	1293.7	1298.7	1303.6	1308.6	1333.3	1358.0	1382.4	1406.9	1455.8	1504.9	h
1.6255	1.6307	1.6358	1.6408	1.6458	1.6507	1.6556	1.6605	1.6835	1.7054	1.7263	1.7464	1.7843	1.8196	n
515.2	525.2	535.2	545.2	555.2	565.2	575.2	585.2	635.2	685.2	735.2	785.2	885.2	985.2	t 208
2.69	2.73	2.76	2.80	2.83	2.86	2.90	2.93	3.10	3.26	3.42	3.58	3.89	4.19	v
1273.6	1278.7	1283.7	1288.8	1293.8	1298.8	1303.8	1308.8	1333.5	1358.1	1382.6	1407.0	1455.9	1505.0	h
1.6252	1.6304	1.6355	1.6405	1.6455	1.6504	1.6552	1.6601	1.6831	1.7050	1.7259	1.7460	1.7839	1.8191	n
515.6	525.6	535.6	545.6	555.6	565.6	575.6	585.6	635.6	685.6	735.6	785.6	885.6	985.6	t 209
2.68	2.71	2.75	2.78	2.81	2.85	2.88	2.92	3.09	3.25	3.40	3.56	3.87	4.17	v
1273.7	1278.8	1283.8	1288.9	1293.9	1298.9	1303.9	1308.9	1333.6	1358.2	1382.7	1407.2	1456.1	1505.2	h
1.6248	1.6300	1.6351	1.6401	1.6451	1.6500	1.6548	1.6597	1.6827	1.7046	1.7255	1.7456	1.7834	1.8187	n
516.0	526.0	536.0	546.0	556.0	566.0	576.0	586.0	636.0	686.0	736.0	786.0	886.0	986.0	t 210
2.67	2.70	2.74	2.77	2.80	2.84	2.87	2.91	3.07	3.23	3.39	3.54	3.85	4.15	v
1273.8	1278.9	1284.0	1289.0	1294.0	1299.0	1304.0	1309.0	1333.7	1358.4	1382.8	1407.3	1456.2	1505.3	h
1.6244	1.6296	1.6347	1.6397	1.6447	1.6496	1.6544	1.6593	1.6823	1.7042	1.7251	1.7452	1.7830	1.8183	n
516.4	526.4	536.4	546.4	556.4	566.4	576.4	586.4	636.4	686.4	736.4	786.4	886.4	986.4	t 211
2.66	2.69	2.72	2.76	2.79	2.83	2.86	2.89	3.06	3.22	3.37	3.53	3.84	4.13	v
1274.0	1278.1	1284.1	1289.2	1294.2	1299.2	1304.2	1309.2	1333.9	1358.5	1383.0	1407.5	1456.4	1505.5	h
1.6241	1.6293	1.6344	1.6394	1.6444	1.6493	1.6541	1.6590	1.6820	1.7039	1.7248	1.7449	1.7827	1.8180	n
516.8	526.8	536.8	546.8	556.8	566.8	576.8	586.8	636.8	686.8	736.8	786.8	886.8	986.8	t 212
2.64	2.68	2.71	2.75	2.78	2.82	2.85	2.88	3.04	3.20	3.36	3.51	3.82	4.12	v
1274.1	1278.2	1284.3	1289.3	1294.3	1299.3	1304.3	1309.3	1334.0	1358.7	1383.1	1407.6	1456.5	1505.6	h
1.6237	1.6289	1.6340	1.6390	1.6440	1.6489	1.6538	1.6587	1.6816	1.7035	1.7244	1.7445	1.7823	1.8176	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
213	t	387.2		397.2	407.2	417.2	427.2	437.2	447.2	457.2	467.2	477.2	487.2	497.2	507.2
	v	0.02	2.16	2.20	2.23	2.27	2.31	2.35	2.38	2.42	2.46	2.49	2.53	2.56	2.60
	h	360.5	1199.1	1206.2	1212.9	1219.3	1225.4	1231.3	1237.1	1242.7	1248.1	1253.4	1258.7	1263.9	1269.1
	n	0.5503	1.5405	1.5488	1.5566	1.5640	1.5710	1.5777	1.5840	1.5901	1.5960	1.6017	1.6073	1.6128	1.6181
214	t	387.6		397.6	407.6	417.6	427.6	437.6	447.6	457.6	467.6	477.6	487.6	497.6	507.6
	v	0.02	2.15	2.19	2.22	2.26	2.30	2.34	2.37	2.41	2.45	2.48	2.52	2.55	2.59
	h	360.1	1199.1	1206.2	1213.0	1219.4	1225.6	1231.5	1237.2	1242.8	1248.3	1253.6	1258.8	1264.0	1269.2
	n	0.5508	1.5401	1.5484	1.5562	1.5636	1.5706	1.5773	1.5836	1.5897	1.5956	1.6014	1.6070	1.6124	1.6177
215	t	388.0		398.0	408.0	418.0	428.0	438.0	448.0	458.0	468.0	478.0	488.0	498.0	508.0
	v	0.02	2.14	2.18	2.21	2.25	2.29	2.33	2.36	2.40	2.43	2.47	2.51	2.54	2.57
	h	361.4	1199.2	1206.3	1213.1	1219.5	1225.7	1231.6	1237.3	1242.9	1248.3	1253.7	1259.0	1264.2	1269.3
	n	0.5513	1.5398	1.5481	1.5559	1.5633	1.5703	1.5770	1.5833	1.5894	1.5953	1.6011	1.6067	1.6121	1.6174
216	t	388.4		398.4	408.4	418.4	428.4	438.4	448.4	458.4	468.4	478.4	488.4	498.4	508.4
	v	0.02	2.13	2.17	2.20	2.24	2.28	2.32	2.35	2.39	2.42	2.46	2.49	2.53	2.56
	h	361.8	1199.3	1206.4	1213.2	1219.6	1225.8	1231.7	1237.4	1243.0	1248.4	1253.8	1259.1	1264.3	1269.4
	n	0.5518	1.5394	1.5478	1.5556	1.5630	1.5700	1.5767	1.5830	1.5891	1.5950	1.6007	1.6063	1.6118	1.6172
217	t	388.8		398.8	408.8	418.8	428.8	438.8	448.8	458.8	468.8	478.8	488.8	498.8	508.8
	v	0.02	2.12	2.16	2.19	2.23	2.27	2.31	2.34	2.38	2.41	2.45	2.48	2.52	2.55
	h	362.2	1199.4	1206.5	1213.3	1219.7	1225.9	1231.8	1237.6	1243.2	1248.6	1253.9	1259.2	1264.4	1269.6
	n	0.5523	1.5390	1.5474	1.5552	1.5626	1.5696	1.5763	1.5826	1.5887	1.5946	1.6004	1.6059	1.6113	1.6167
218	t	389.1		399.1	409.1	419.1	429.1	439.1	449.1	459.1	469.1	479.1	489.1	499.1	509.1
	v	0.02	2.11	2.15	2.18	2.22	2.26	2.30	2.33	2.37	2.40	2.44	2.47	2.51	2.54
	h	362.6	1199.4	1206.6	1213.4	1219.8	1226.0	1231.9	1237.7	1243.3	1248.7	1254.0	1259.3	1264.5	1269.7
	n	0.5528	1.5386	1.5470	1.5548	1.5622	1.5693	1.5759	1.5822	1.5883	1.5943	1.6000	1.6055	1.6110	1.6164
219	t	389.5		399.5	409.5	419.5	429.5	439.5	449.5	459.5	469.5	479.5	489.5	499.5	509.5
	v	0.02	2.10	2.14	2.17	2.21	2.25	2.29	2.32	2.36	2.39	2.43	2.46	2.50	2.53
	h	363.0	1199.5	1206.7	1213.5	1219.9	1226.1	1232.0	1237.8	1243.4	1248.9	1254.2	1259.4	1264.6	1269.8
	n	0.5533	1.5383	1.5467	1.5545	1.5619	1.5690	1.5756	1.5819	1.5880	1.5940	1.5997	1.6052	1.6107	1.6161
220	t	389.9		399.9	409.9	419.9	429.9	439.9	449.9	459.9	469.9	479.9	489.9	499.9	509.9
	v	0.02	2.09	2.13	2.16	2.20	2.24	2.28	2.31	2.35	2.38	2.42	2.45	2.49	2.52
	h	363.4	1199.6	1206.8	1213.6	1220.0	1226.2	1232.2	1237.9	1243.5	1248.9	1254.3	1259.6	1264.8	1269.9
	n	0.5538	1.5379	1.5463	1.5541	1.5616	1.5686	1.5753	1.5816	1.5877	1.5936	1.5993	1.6049	1.6104	1.6157
221	t	390.3		400.3	410.3	420.3	430.3	440.3	450.3	460.3	470.3	480.3	490.3	500.3	510.3
	v	0.02	2.08	2.12	2.15	2.19	2.23	2.27	2.30	2.34	2.37	2.41	2.44	2.48	2.51
	h	363.8	1199.6	1206.8	1213.7	1220.1	1226.3	1232.3	1238.0	1243.6	1249.0	1254.4	1259.7	1264.9	1270.0
	n	0.5543	1.5376	1.5460	1.5538	1.5613	1.5683	1.5750	1.5813	1.5874	1.5933	1.5990	1.6046	1.6101	1.6154
222	t	390.7		400.7	410.7	420.7	430.7	440.7	450.7	460.7	470.7	480.7	490.7	500.7	510.7
	v	0.02	2.07	2.11	2.14	2.18	2.22	2.26	2.29	2.33	2.36	2.40	2.43	2.47	2.50
	h	364.2	1199.7	1206.9	1213.8	1220.2	1226.4	1232.4	1238.2	1243.8	1249.2	1254.5	1259.8	1265.0	1270.2
	n	0.5548	1.5372	1.5456	1.5535	1.5609	1.5680	1.5747	1.5810	1.5871	1.5930	1.5987	1.6043	1.6098	1.6151
223	t	391.1		401.1	411.1	421.1	431.1	441.1	451.1	461.1	471.1	481.1	491.1	501.1	511.1
	v	0.02	2.06	2.10	2.13	2.17	2.21	2.25	2.28	2.32	2.35	2.39	2.42	2.46	2.49
	h	364.6	1199.8	1207.0	1213.9	1220.3	1226.5	1232.5	1238.3	1243.9	1249.3	1254.6	1259.9	1265.1	1270.3
	n	0.5553	1.5369	1.5453	1.5532	1.5606	1.5677	1.5744	1.5807	1.5868	1.5927	1.5984	1.6040	1.6095	1.6148
224	t	391.5		401.5	411.5	421.5	431.5	441.5	451.5	461.5	471.5	481.5	491.5	501.5	511.5
	v	0.02	2.06	2.10	2.13	2.16	2.20	2.24	2.27	2.31	2.34	2.38	2.41	2.44	2.48
	h	365.0	1199.8	1207.1	1214.0	1220.4	1226.6	1232.6	1238.4	1244.0	1249.5	1254.8	1260.0	1265.2	1270.4
	n	0.5557	1.5365	1.5450	1.5528	1.5603	1.5674	1.5740	1.5803	1.5864	1.5923	1.5980	1.6036	1.6091	1.6145

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = $\bar{1}$.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat															
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		Press. lbs.
517.2	527.2	537.2	547.2	557.2	567.2	577.2	587.2	637.2	687.2	737.2	787.2	887.2	987.2	t	213
2.63	2.67	2.70	2.74	2.77	2.80	2.83	2.87	3.03	3.19	3.34	3.50	3.80	4.10	v	
1274.2	1279.3	1284.4	1289.4	1294.4	1299.4	1304.4	1309.4	1334.1	1358.7	1383.3	1407.8	1456.7	1505.8	h	
1.6234	1.6286	1.6337	1.6387	1.6437	1.6486	1.6534	1.6583	1.6812	1.7031	1.7240	1.7441	1.7819	1.8172	n	
517.6	527.6	537.6	547.6	557.6	567.6	577.6	587.6	637.6	687.6	737.6	787.6	887.6	987.6	t	214
2.62	2.66	2.69	2.72	2.76	2.79	2.82	2.86	3.02	3.18	3.33	3.48	3.79	4.08	v	
1274.3	1279.4	1284.5	1289.6	1294.6	1299.6	1304.6	1309.6	1334.3	1358.9	1383.4	1407.9	1456.8	1506.0	h	
1.6230	1.6282	1.6333	1.6383	1.6433	1.6482	1.6530	1.6579	1.6808	1.7027	1.7236	1.7437	1.7815	1.8167	n	
518.0	528.0	538.0	548.0	558.0	568.0	578.0	588.0	638.0	688.0	738.0	788.0	888.0	988.0	t	215
2.61	2.64	2.68	2.71	2.74	2.78	2.81	2.84	3.00	3.16	3.31	3.47	3.78	4.06	v	
1274.5	1279.6	1284.6	1289.7	1294.7	1299.7	1304.7	1309.7	1334.4	1359.1	1383.6	1408.0	1457.0	1506.1	h	
1.6227	1.6279	1.6330	1.6380	1.6430	1.6479	1.6527	1.6576	1.6805	1.7024	1.7233	1.7434	1.7812	1.8164	n	
518.4	528.4	538.4	548.4	558.4	568.4	578.4	588.4	638.4	688.4	738.4	788.4	888.4	988.4	t	216
2.60	2.63	2.66	2.70	2.73	2.77	2.80	2.83	2.99	3.15	3.30	3.45	3.76	4.04	v	
1274.6	1279.7	1284.8	1289.8	1294.8	1299.8	1304.8	1309.8	1334.6	1359.2	1383.7	1408.2	1457.1	1506.2	h	
1.6224	1.6275	1.6326	1.6376	1.6426	1.6475	1.6523	1.6572	1.6802	1.7020	1.7229	1.7430	1.7808	1.8160	n	
518.8	528.8	538.8	548.8	558.8	568.8	578.8	588.8	638.8	688.8	738.8	788.8	888.8	988.8	t	217
2.59	2.62	2.65	2.69	2.72	2.75	2.78	2.82	2.98	3.14	3.29	3.44	3.74	4.03	v	
1274.7	1279.8	1284.9	1289.9	1295.0	1300.0	1304.9	1309.9	1334.7	1359.4	1383.8	1408.4	1457.3	1506.4	h	
1.6220	1.6272	1.6322	1.6372	1.6422	1.6471	1.6519	1.6568	1.6798	1.7016	1.7225	1.7426	1.7804	1.8156	n	
519.1	529.1	539.1	549.1	559.1	569.1	579.1	589.1	639.1	689.1	739.1	789.1	889.1	989.1	t	218
2.58	2.61	2.64	2.68	2.71	2.74	2.77	2.80	2.96	3.12	3.27	3.42	3.72	4.01	v	
1274.8	1279.9	1285.0	1290.0	1295.1	1300.1	1305.1	1310.1	1334.8	1359.4	1384.0	1408.5	1457.4	1506.6	h	
1.6216	1.6268	1.6318	1.6368	1.6419	1.6468	1.6516	1.6565	1.6794	1.7012	1.7221	1.7422	1.7800	1.8152	n	
519.5	529.5	539.5	549.5	559.5	569.5	579.5	589.5	639.5	689.5	739.5	789.5	889.5	989.5	t	219
2.56	2.60	2.63	2.66	2.70	2.73	2.76	2.79	2.95	3.11	3.26	3.41	3.71	3.99	v	
1274.9	1280.0	1285.1	1290.2	1295.2	1300.2	1305.2	1310.2	1335.0	1359.6	1384.1	1408.6	1457.6	1506.7	h	
1.6213	1.6265	1.6315	1.6365	1.6416	1.6465	1.6513	1.6562	1.6791	1.7009	1.7218	1.7419	1.7796	1.8149	n	
519.9	529.9	539.9	549.9	559.9	569.9	579.9	589.9	639.9	689.9	739.9	789.9	889.9	989.9	t	220
2.55	2.59	2.62	2.65	2.68	2.72	2.75	2.78	2.94	3.10	3.25	3.40	3.69	3.98	v	
1275.1	1280.2	1285.2	1290.3	1295.4	1300.4	1305.3	1310.3	1335.1	1359.8	1384.3	1408.8	1457.7	1506.8	h	
1.6209	1.6261	1.6312	1.6362	1.6412	1.6461	1.6509	1.6558	1.6787	1.7005	1.7214	1.7415	1.7792	1.8145	n	
520.3	530.3	540.3	550.3	560.3	570.3	580.3	590.3	640.3	690 3	740.3	790.3	890.3	990.3	t	221
2.54	2.58	2.61	2.64	2.67	2.71	2.74	2.77	2.93	3 08	3.23	3.38	3.68	3.96	v	
1275.2	1280.3	1285.4	1290.4	1295.5	1300.5	1305.4	1310.4	1335.2	1359.9	1384.4	1408.9	1457.8	1507.0	h	
1.6206	1.6258	1.6309	1.6359	1.6409	1.6458	1.6506	1.6555	1.6784	1.7002	1.7211	1.7412	1.7789	1.8141	n	
520.7	530.7	540.7	550.7	560.7	570.7	580.7	590.7	640.7	690.7	740.7	790.7	890.7	990 7	t	222
2.53	2.56	2.60	2.63	2.66	2.70	2.73	2.76	2.92	3.07	3.22	3.37	3.66	3.94	v	
1275.3	1280.4	1285.5	1290.5	1295.6	1300.6	1305.6	1310.6	1335.3	1360.0	1384.5	1409.0	1458.0	1507.2	h	
1.6203	1.6255	1.6306	1.6356	1.6405	1.6454	1.6502	1.6551	1.6780	1.6998	1.7207	1.7408	1.7785	1.8137	n	
521.1	531.1	541.1	551.1	561.1	571.1	581.1	591.1	641.1	691.1	741.1	791.1	891.1	991.1	t	223
2.52	2.55	2.59	2.62	2.65	2.68	2 71	2.75	2.91	3.06	3.21	3.35	3.64	3.92	v	
1275.4	1280.5	1285.6	1290.6	1295.7	1300.7	1305.7	1310.7	1335.5	1360.2	1384.7	1409.2	1458.1	1507.3	h	
1.6200	1.6252	1.6303	1.6353	1.6402	1.6451	1.6499	1.6548	1.6777	1.6995	1.7204	1.7405	1.7782	1.8134	n	
521.5	531.5	541.5	551.5	561.5	571.5	581.5	591.5	641.5	691.5	741.5	791.5	891.5	991.5	t	224
2.51	2.54	2.58	2.61	2.64	2.67	2.70	2.74	2.89	3.04	3.19	3.34	3.63	3.91	v	
1275.6	1280.7	1285.7	1290.8	1295.8	1300.8	1305.8	1310.8	1335.6	1360.3	1384.8	1409.3	1458.3	1507.4	h	
1.6197	1.6248	1.6299	1.6349	1.6399	1.6448	1.6496	1.6545	1.6774	1.6991	1.7200	1.7401	1.7778	1.8130	n	

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by 9/5 and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by 9/5. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
225	t	391.9		401.9	411.9	421.9	431.9	441.9	451.9	461.9	471.9	481.9	491.9	501.9	511.9
	v	0.02	2.05	2.09	2.12	2.15	2.19	2.23	2.26	2.30	2.33	2.37	2.40	2.43	2.47
	h	365.5	1199.9	1207.2	1214.1	1220.5	1226.8	1232.7	1238.5	1244.1	1249.5	1254.9	1260.2	1265.4	1270.5
	n	0.5562	1.5361	1.5447	1.5525	1.5600	1.5671	1.5738	1.5800	1.5861	1.5920	1.5977	1.6033	1.6088	1.6141
226	t	392.2		402.2	412.2	422.2	432.2	442.2	452.2	462.2	472.2	482.2	492.2	502.2	512.2
	v	0.02	2.04	2.08	2.11	2.14	2.18	2.22	2.25	2.29	2.32	2.36	2.39	2.42	2.46
	h	365.9	1200.0	1207.3	1214.2	1220.6	1226.9	1232.8	1238.6	1244.2	1249.7	1255.0	1260.3	1265.6	1270.7
	n	0.5567	1.5358	1.5443	1.5522	1.5596	1.5667	1.5734	1.5797	1.5858	1.5917	1.5974	1.6030	1.6085	1.6138
227	t	392.6		402.6	412.6	422.6	432.6	442.6	452.6	462.6	472.6	482.6	492.6	502.6	512.6
	v	0.02	2.03	2.07	2.10	2.14	2.17	2.21	2.24	2.28	2.31	2.35	2.38	2.41	2.45
	h	366.3	1200.0	1207.3	1214.2	1220.7	1227.0	1232.9	1238.7	1244.3	1249.8	1255.1	1260.4	1265.7	1270.8
	n	0.5572	1.5355	1.5440	1.5519	1.5593	1.5664	1.5731	1.5794	1.5855	1.5914	1.5971	1.6027	1.6082	1.6135
228	t	393.0		403.0	413.0	423.0	433.0	443.0	453.0	463.0	473.0	483.0	493.0	503.0	513.0
	v	0.02	2.02	2.06	2.09	2.13	2.16	2.20	2.23	2.27	2.30	2.34	2.37	2.40	2.44
	h	366.7	1200.1	1207.4	1214.3	1220.8	1227.1	1233.0	1238.8	1244.4	1249.9	1255.2	1260.5	1265.8	1270.9
	n	0.5577	1.5351	1.5436	1.5515	1.5590	1.5661	1.5728	1.5791	1.5852	1.5910	1.5967	1.6023	1.6078	1.6131
229	t	393.4		403.4	413.4	423.4	433.4	443.4	453.4	463.4	473.4	483.4	493.4	503.4	513.4
	v	0.02	2.01	2.05	2.08	2.12	2.16	2.19	2.23	2.26	2.29	2.33	2.36	2.39	2.43
	h	367.1	1200.2	1207.5	1214.4	1220.9	1227.2	1233.1	1238.9	1244.6	1250.0	1255.3	1260.6	1265.9	1271.1
	n	0.5582	1.5348	1.5433	1.5512	1.5587	1.5658	1.5725	1.5788	1.5849	1.5908	1.5965	1.6020	1.6075	1.6128
230	t	393.8		403.8	413.8	423.8	433.8	443.8	453.8	463.8	473.8	483.8	493.8	503.8	513.8
	v	0.02	2.00	2.04	2.07	2.11	2.15	2.18	2.22	2.25	2.28	2.32	2.35	2.38	2.42
	h	367.5	1200.2	1207.6	1214.5	1221.0	1227.3	1233.2	1239.0	1244.7	1250.1	1255.4	1260.7	1266.0	1271.1
	n	0.5586	1.5344	1.5430	1.5509	1.5584	1.5655	1.5721	1.5784	1.5845	1.5904	1.5961	1.6017	1.6072	1.6125
231	t	394.1		404.1	414.1	424.1	434.1	444.1	454.1	464.1	474.1	484.1	494.1	504.1	514.1
	v	0.02	1.99	2.03	2.06	2.10	2.14	2.17	2.21	2.24	2.28	2.31	2.34	2.38	2.41
	h	367.9	1200.3	1207.7	1214.6	1221.1	1227.4	1233.4	1239.2	1244.8	1250.3	1255.6	1260.9	1266.1	1271.2
	n	0.5591	1.5341	1.5427	1.5506	1.5581	1.5652	1.5718	1.5781	1.5842	1.5901	1.5958	1.6014	1.6069	1.6122
232	t	394.5		404.5	414.5	424.5	434.5	444.5	454.5	464.5	474.5	484.5	494.5	504.5	514.5
	v	0.02	1.99	2.03	2.06	2.09	2.13	2.16	2.20	2.23	2.27	2.30	2.33	2.37	2.40
	h	368.3	1200.4	1207.8	1214.7	1221.2	1227.5	1233.5	1239.3	1244.9	1250.4	1255.7	1261.0	1266.3	1271.4
	n	0.5596	1.5337	1.5423	1.5502	1.5577	1.5648	1.5715	1.5778	1.5839	1.5898	1.5955	1.6011	1.6065	1.6118
233	t	394.9		404.9	414.9	424.9	434.9	444.9	454.9	464.9	474.9	484.9	494.9	504.9	514.9
	v	0.02	1.98	2.02	2.05	2.08	2.12	2.16	2.19	2.22	2.26	2.29	2.32	2.36	2.39
	h	368.7	1200.4	1207.8	1214.8	1221.3	1227.6	1233.6	1239.4	1245.0	1250.5	1255.8	1261.1	1266.4	1271.5
	n	0.5601	1.5334	1.5420	1.5499	1.5574	1.5645	1.5712	1.5775	1.5836	1.5895	1.5952	1.6008	1.6062	1.6115
234	t	395.2		405.2	415.2	425.2	435.2	445.2	455.2	465.2	475.2	485.2	495.2	505.2	515.2
	v	0.02	1.97	2.01	2.04	2.07	2.11	2.15	2.18	2.22	2.25	2.28	2.31	2.35	2.38
	h	369.0	1200.5	1207.9	1214.9	1221.4	1227.7	1233.7	1239.5	1245.1	1250.6	1255.9	1261.2	1266.5	1271.6
	n	0.5605	1.5330	1.5416	1.5496	1.5571	1.5642	1.5709	1.5772	1.5833	1.5891	1.5948	1.6004	1.6059	1.6112
235	t	395.6		405.6	415.6	425.6	435.6	445.6	455.6	465.6	475.6	485.6	495.6	505.6	515.6
	v	0.02	1.96	2.00	2.03	2.07	2.10	2.14	2.17	2.21	2.24	2.27	2.30	2.34	2.37
	h	369.4	1200.6	1208.0	1215.0	1221.5	1227.8	1233.8	1239.6	1245.2	1250.7	1256.1	1261.4	1266.6	1271.7
	n	0.5610	1.5327	1.5413	1.5493	1.5568	1.5639	1.5706	1.5769	1.5830	1.5888	1.5945	1.6001	1.6056	1.6109
236	t	396.0		406.0	416.0	426.0	436.0	446.0	456.0	466.0	476.0	486.0	496.0	506.0	516.0
	v	0.02	1.96	1.99	2.02	2.06	2.09	2.13	2.16	2.20	2.23	2.26	2.30	2.33	2.36
	h	369.8	1200.6	1208.0	1215.0	1221.6	1227.9	1233.9	1239.7	1245.3	1250.8	1256.2	1261.5	1266.7	1271.8
	n	0.5615	1.5323	1.5409	1.5489	1.5564	1.5635	1.5702	1.5765	1.5826	1.5885	1.5942	1.5998	1.6052	1.6105
237	t	396.4		406.4	416.4	426.4	436.4	446.4	456.4	466.4	476.4	486.4	496.4	506.4	516.4
	v	0.02	1.95	1.98	2.01	2.05	2.09	2.12	2.16	2.19	2.22	2.25	2.29	2.32	2.35
	h	370.2	1200.7	1208.1	1215.1	1221.7	1228.0	1234.0	1239.8	1245.4	1250.9	1256.3	1261.6	1266.8	1271.9
	n	0.5619	1.5319	1.5405	1.5485	1.5561	1.5632	1.5699	1.5762	1.5823	1.5882	1.5939	1.5994	1.6049	1.6102

Degrees of Superheat														Press. lbs.	
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°		
521.9	531.9	541.9	551.9	561.9	571.9	581.9	591.9	641.9	691.9	741.9	791.9	891.9	991.9	t	225
2.50	2.53	2.57	2.60	2.63	2.66	2.69	2.72	2.88	3.03	3.18	3.33	3.62	3.89	v	
1275.7	1280.8	1285.9	1290.9	1296.0	1301.0	1305.9	1310.9	1335.7	1360.3	1384.9	1409.4	1458.4	1507.6	h	
1.6194	1.6245	1.6296	1.6346	1.6396	1.6445	1.6493	1.6542	1.6771	1.6988	1.7197	1.7398	1.7775	1.8127	n	
522.2	532.2	542.2	552.2	562.2	572.2	582.2	592.2	642.2	692.2	742.2	792.2	892.2	992.2	t	226
2.49	2.52	2.56	2.59	2.62	2.65	2.68	2.71	2.87	3.02	3.17	3.31	3.60	3.88	v	
1275.8	1280.9	1286.0	1291.0	1296.1	1301.1	1306.1	1311.1	1335.8	1360.5	1385.0	1409.6	1458.6	1507.7	h	
1.6190	1.6242	1.6293	1.6343	1.6392	1.6441	1.6489	1.6538	1.6767	1.6985	1.7193	1.7394	1.7771	1.8123	n	
522.6	532.6	542.6	552.6	562.6	572.6	582.6	592.6	642.6	692.6	742.6	792.6	892.6	992.6	t	227
2.48	2.51	2.55	2.58	2.61	2.64	2.67	2.70	2.86	3.01	3.15	3.30	3.59	3.86	v	
1275.9	1281.0	1286.1	1291.1	1296.2	1301.2	1306.2	1311.2	1336.0	1360.6	1385.2	1409.7	1458.7	1507.9	h	
1.6187	1.6239	1.6290	1.6340	1.6389	1.6438	1.6486	1.6535	1.6764	1.6982	1.7190	1.7391	1.7768	1.8119	n	
523.0	533.0	543.0	553.0	563.0	573.0	583.0	593.0	643.0	693.0	743.0	793.0	893.0	993.0	t	228
2.47	2.50	2.54	2.57	2.60	2.63	2.66	2.69	2.84	2.99	3.14	3.29	3.57	3.84	v	
1276.0	1281.1	1286.2	1291.2	1296.3	1301.3	1306.3	1311.3	1336.1	1360.8	1385.3	1409.8	1458.8	1508.0	h	
1.6184	1.6235	1.6286	1.6336	1.6386	1.6435	1.6483	1.6531	1.6760	1.6978	1.7186	1.7387	1.7764	1.8115	n	
523.4	533.4	543.4	553.4	563.4	573.4	583.4	593.4	643.4	693.4	743.4	793.4	893.4	993.4	t	229
2.46	2.49	2.52	2.56	2.59	2.62	2.65	2.68	2.83	2.98	3.13	3.28	3.56	3.83	v	
1276.2	1281.3	1286.3	1291.3	1296.4	1301.4	1306.4	1311.4	1336.2	1360.9	1385.4	1410.0	1459.0	1508.2	h	
1.6181	1.6233	1.6283	1.6333	1.6383	1.6432	1.6480	1.6528	1.6757	1.6975	1.7183	1.7383	1.7761	1.8112	n	
523.8	533.8	543.8	553.8	563.8	573.8	583.8	593.8	643.8	693.8	743.8	793.8	893.8	993.8	t	230
2.45	2.48	2.51	2.55	2.58	2.61	2.64	2.67	2.82	2.97	3.12	3.26	3.54	3.82	v	
1276.3	1281.4	1286.5	1291.5	1296.5	1301.5	1306.5	1311.6	1336.3	1361.0	1385.6	1410.1	1459.1	1508.3	h	
1.6177	1.6229	1.6280	1.6330	1.6379	1.6428	1.6476	1.6525	1.6753	1.6971	1.7179	1.7379	1.7757	1.8108	n	
524.1	534.1	544.1	554.1	564.1	574.1	584.1	594.1	644.1	694.1	744.1	794.1	894.1	994.1	t	231
2.44	2.47	2.50	2.54	2.57	2.60	2.63	2.66	2.81	2.96	3.10	3.25	3.53	3.80	v	
1276.4	1281.5	1286.6	1291.6	1296.7	1301.7	1306.6	1311.7	1336.4	1361.2	1385.7	1410.3	1459.3	1508.5	h	
1.6174	1.6226	1.6277	1.6327	1.6376	1.6425	1.6473	1.6522	1.6750	1.6968	1.7176	1.7376	1.7754	1.8105	n	
524.5	534.5	544.5	554.5	564.5	574.5	584.5	594.5	644.5	694.5	744.5	794.5	894.5	994.5	t	232
2.43	2.46	2.49	2.52	2.56	2.59	2.62	2.65	2.80	2.95	3.09	3.23	3.51	3.78	v	
1276.5	1281.6	1286.7	1291.7	1296.8	1301.8	1306.8	1311.8	1336.6	1361.3	1385.8	1410.4	1459.4	1508.6	h	
1.6170	1.6222	1.6273	1.6323	1.6372	1.6421	1.6469	1.6518	1.6747	1.6964	1.7172	1.7372	1.7749	1.8101	n	
524.9	534.9	544.9	554.9	564.9	574.9	584.9	594.9	644.9	694.9	744.9	794.9	894.9	994.9	t	233
2.42	2.45	2.48	2.51	2.55	2.58	2.61	2.64	2.79	2.93	3.08	3.22	3.50	3.77	v	
1276.6	1281.7	1286.8	1291.9	1296.9	1301.9	1306.9	1311.9	1336.7	1361.4	1386.0	1410.6	1459.6	1508.8	h	
1.6167	1.6219	1.6270	1.6320	1.6369	1.6418	1.6466	1.6515	1.6744	1.6961	1.7169	1.7369	1.7746	1.8098	n	
525.2	535.2	545.2	555.2	565.2	575.2	585.2	595.2	645.2	695.2	745.2	795.2	895.2	995.2	t	234
2.41	2.44	2.47	2.50	2.54	2.57	2.60	2.63	2.78	2.92	3.07	3.21	3.49	3.76	v	
1276.8	1281.9	1287.0	1292.0	1297.0	1302.0	1307.0	1312.0	1336.8	1361.6	1386.1	1410.7	1459.7	1508.9	h	
1.6164	1.6216	1.6267	1.6317	1.6366	1.6415	1.6463	1.6512	1.6740	1.6957	1.7165	1.7365	1.7742	1.8094	n	
525.6	535.6	545.6	555.6	565.6	575.6	585.6	595.6	645.6	695.6	745.6	795.6	895.6	995.6	t	235
2.40	2.43	2.46	2.50	2.53	2.56	2.59	2.62	2.77	2.91	3.06	3.20	3.47	3.74	v	
1276.9	1282.0	1287.1	1292.1	1297.1	1302.1	1307.1	1312.2	1337.0	1361.7	1386.2	1410.8	1459.8	1509.0	h	
1.6161	1.6213	1.6264	1.6314	1.6363	1.6412	1.6460	1.6509	1.6737	1.6954	1.7162	1.7362	1.7739	1.8091	n	
526.0	536.0	546.0	556.0	566.0	576.0	586.0	596.0	646.0	696.0	746.0	796.0	896.0	996.0	t	236
2.39	2.42	2.45	2.49	2.52	2.55	2.58	2.61	2.76	2.90	3.04	3.18	3.46	3.73	v	
1277.0	1282.1	1287.2	1292.2	1297.2	1302.2	1307.2	1312.3	1337.1	1361.8	1386.4	1411.0	1460.0	1509.2	h	
1.6157	1.6209	1.6260	1.6310	1.6359	1.6408	1.6456	1.6505	1.6733	1.6951	1.7158	1.7358	1.7735	1.8087	n	
526.4	536.4	546.4	556.4	566.4	576.4	586.4	596.4	646.4	696.4	746.4	796.4	896.4	996.4	t	237
2.38	2.41	2.44	2.48	2.51	2.54	2.57	2.60	2.75	2.89	3.03	3.17	3.44	3.71	v	
1277.1	1282.2	1287.3	1292.3	1297.3	1302.4	1307.4	1312.4	1337.2	1361.9	1386.5	1411.1	1460.1	1509.3	h	
1.6154	1.6206	1.6256	1.6306	1.6355	1.6404	1.6452	1.6501	1.6729	1.6947	1.7154	1.7354	1.7731	1.8082	n	

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
238	t	396.7		406.7	416.7	426.7	436.7	446.7	456.7	466.7	476.7	486.7	496.7	506.7	516.7
	v	0.02	1.94	1.98	2.01	2.04	2.08	2.11	2.15	2.18	2.21	2.24	2.28	2.31	2.34
	h	370.6	1200.7	1208.2	1215.2	1221.8	1228.1	1234.1	1239.9	1245.5	1251.0	1256.4	1261.7	1266.9	1272.1
	n	0.5624	1.5316	1.5402	1.5482	1.5558	1.5629	1.5696	1.5759	1.5820	1.5879	1.5936	1.5991	1.6046	1.6099
239	t	397.1		407.1	417.1	427.1	437.1	447.1	457.1	467.1	477.1	487.1	497.1	507.1	517.1
	v	0.02	1.93	1.97	2.00	2.03	2.07	2.10	2.14	2.17	2.20	2.24	2.27	2.30	2.33
	h	371.0	1200.8	1208.3	1215.3	1221.9	1228.2	1234.2	1240.0	1245.7	1251.2	1256.5	1261.8	1267.1	1272.3
	n	0.5629	1.5313	1.5399	1.5479	1.5555	1.5626	1.5693	1.5756	1.5817	1.5876	1.5933	1.5988	1.6043	1.6096
240	t	397.4		407.4	417.4	427.4	437.4	447.4	457.4	467.4	477.4	487.4	497.4	507.4	517.4
	v	0.02	1.92	1.96	1.99	2.02	2.06	2.09	2.13	2.16	2.20	2.23	2.26	2.29	2.32
	h	371.4	1200.9	1208.4	1215.4	1222.0	1228.3	1234.3	1240.1	1245.8	1251.3	1256.6	1261.9	1267.1	1272.3
	n	0.5633	1.5309	1.5396	1.5476	1.5552	1.5623	1.5690	1.5753	1.5814	1.5873	1.5930	1.5985	1.6040	1.6093
241	t	397.8		407.8	417.8	427.8	437.8	447.8	457.8	467.8	477.8	487.8	497.8	507.8	517.8
	v	0.02	1.92	1.95	1.98	2.02	2.05	2.09	2.12	2.16	2.19	2.22	2.25	2.28	2.31
	h	371.8	1200.9	1208.5	1215.5	1222.1	1228.4	1234.4	1240.2	1245.9	1251.4	1256.7	1262.0	1267.2	1272.4
	n	0.5638	1.5306	1.5393	1.5473	1.5549	1.5620	1.5687	1.5750	1.5811	1.5870	1.5927	1.5982	1.6037	1.6090
242	t	398.2		408.2	418.2	428.2	438.2	448.2	458.2	468.2	478.2	488.2	498.2	508.2	518.2
	v	0.02	1.91	1.94	1.97	2.01	2.04	2.08	2.11	2.15	2.18	2.21	2.24	2.27	2.30
	h	372.2	1201.0	1208.5	1215.6	1222.2	1228.5	1234.5	1240.4	1246.0	1251.5	1256.9	1262.2	1267.4	1272.5
	n	0.5642	1.5303	1.5390	1.5470	1.5546	1.5617	1.5684	1.5747	1.5808	1.5867	1.5924	1.5979	1.6034	1.6087
243	t	398.5		408.5	418.5	428.5	438.5	448.5	458.5	468.5	478.5	488.5	498.5	508.5	518.5
	v	0.02	1.90	1.93	1.96	2.00	2.04	2.07	2.10	2.14	2.17	2.20	2.23	2.26	2.30
	h	372.6	1201.1	1208.6	1215.7	1222.3	1228.6	1234.6	1240.5	1246.1	1251.6	1257.0	1262.3	1267.5	1272.6
	n	0.5647	1.5300	1.5387	1.5467	1.5543	1.5614	1.5681	1.5744	1.5805	1.5864	1.5921	1.5976	1.6031	1.6084
244	t	398.9		408.9	418.9	428.9	438.9	448.9	458.9	468.9	478.9	488.9	498.9	508.9	518.9
	v	0.02	1.89	1.93	1.96	1.99	2.03	2.06	2.10	2.13	2.16	2.19	2.22	2.26	2.29
	h	372.9	1201.1	1208.7	1215.8	1222.4	1228.7	1234.7	1240.6	1246.2	1251.7	1257.1	1262.4	1267.6	1272.7
	n	0.5651	1.5297	1.5384	1.5464	1.5540	1.5611	1.5678	1.5741	1.5802	1.5861	1.5918	1.5973	1.6028	1.6081
245	t	399.3		409.3	419.3	429.3	439.3	449.3	459.3	469.3	479.3	489.3	499.3	509.3	519.3
	v	0.02	1.89	1.92	1.95	1.99	2.02	2.05	2.09	2.12	2.15	2.18	2.22	2.25	2.28
	h	373.3	1201.2	1208.8	1215.9	1222.5	1228.8	1234.8	1240.7	1246.3	1251.8	1257.2	1262.5	1267.7	1272.8
	n	0.5655	1.5293	1.5381	1.5461	1.5537	1.5608	1.5675	1.5738	1.5799	1.5858	1.5915	1.5970	1.6025	1.6078
246	t	399.6		409.6	419.6	429.6	439.6	449.6	459.6	469.6	479.6	489.6	499.6	509.6	519.6
	v	0.02	1.88	1.91	1.94	1.98	2.01	2.05	2.08	2.11	2.14	2.18	2.21	2.24	2.27
	h	373.7	1201.2	1208.8	1215.9	1222.6	1228.9	1234.9	1240.8	1246.4	1251.9	1257.3	1262.6	1267.8	1272.9
	n	0.5659	1.5289	1.5377	1.5458	1.5533	1.5605	1.5672	1.5735	1.5796	1.5855	1.5912	1.5967	1.6022	1.6075
247	t	400.0		410.0	420.0	430.0	440.0	450.0	460.0	470.0	480.0	490.0	500.0	510.0	520.0
	v	0.02	1.87	1.90	1.93	1.97	2.00	2.04	2.07	2.10	2.14	2.17	2.20	2.23	2.26
	h	374.1	1201.3	1208.9	1216.0	1222.7	1229.0	1235.0	1240.9	1246.6	1252.0	1257.4	1262.7	1267.9	1273.0
	n	0.5663	1.5286	1.5374	1.5455	1.5530	1.5602	1.5669	1.5732	1.5793	1.5852	1.5909	1.5964	1.6019	1.6072
248	t	400.3		410.3	420.3	430.3	440.3	450.3	460.3	470.3	480.3	490.3	500.3	510.3	520.3
	v	0.02	1.86	1.90	1.93	1.96	2.00	2.03	2.06	2.10	2.13	2.16	2.19	2.22	2.25
	h	374.5	1201.4	1209.0	1216.1	1222.8	1229.1	1235.2	1241.0	1246.7	1252.1	1257.5	1262.8	1268.0	1273.2
	n	0.5668	1.5283	1.5371	1.5452	1.5527	1.5599	1.5666	1.5729	1.5790	1.5849	1.5906	1.5961	1.6016	1.6069
249	t	400.7		410.7	420.7	430.7	440.7	450.7	460.7	470.7	480.7	490.7	500.7	510.7	520.7
	v	0.02	1.86	1.89	1.92	1.96	1.99	2.03	2.06	2.09	2.12	2.15	2.18	2.21	2.24
	h	374.8	1201.4	1209.1	1216.2	1222.9	1229.2	1235.3	1241.1	1246.8	1252.2	1257.6	1262.9	1268.1	1273.3
	n	0.5672	1.5279	1.5367	1.5448	1.5524	1.5596	1.5663	1.5726	1.5787	1.5846	1.5903	1.5958	1.6012	1.6065

t = temperature in F. degs. T° Fahr. absolute = t° + 459.6°.
v = sp. vol. in cu. ft. per lb. J = 777.5 ft. lbs. per B. t. u. [log = 2.89 071].
h = total heat in B. t. u. A = 1/J = 1.286 × 10⁻³ B. t. u. per ft. lb. [3.10 929].
n = entropy. 144 A = 0.1852 [log = 1.26 764].

Internal energy = total heat − 144 Apv.
Values for saturated steam are given in Tables 1 and 2.

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
526.7	536.7	546.7	556.7	566.7	576.7	586 7	596.7	646.7	696.7	746.7	796.7	896.7	996.7	t 238
2.37	2.40	2.44	2.47	2.50	2.53	2.56	2.59	2.74	2.88	3.02	3.16	3.44	3.70	v
1277.2	1282.3	1287.4	1292.4	1297.5	1302.5	1307.5	1312.5	1337.3	1362.0	1386.6	1411.2	1460.2	1509.5	h
1.6151	1.6203	1.6253	1.6302	1.6352	1.6401	1.6449	1.6498	1.6726	1.6944	1.7151	1.7351	1.7728	1.8079	n
527.1	537.1	547.1	557.1	567.1	577.1	587.1	597.1	647.1	697.1	747.1	797.1	897.1	997.1	t 239
2.36	2.40	2.43	2.46	2.49	2.52	2.55	2.58	2.73	2.87	3.01	3.15	3.42	3.68	v
1277.4	1282.5	1287.5	1292.6	1297.6	1302.6	1307.6	1312.6	1337.5	1362.2	1386.8	1411.4	1460.4	1509.6	h
1.6148	1.6200	1.6250	1.6299	1.6349	1.6398	1.6446	1.6495	1.6723	1.6941	1.7148	1.7348	1.7725	1.8076	n
527.4	537.4	547.4	557.4	567.4	577.4	587.4	597.4	647.4	697.4	747.4	797.4	897.4	997.4	t 240
2.35	2.39	2.42	2.45	2.48	2.51	2.54	2.57	2.71	2.85	2.99	3.13	3.40	3.67	v
1277.5	1282.6	1287.6	1292.7	1297.7	1302.7	1307.7	1312.8	1337.6	1362.3	1386.9	1411.5	1460.5	1509.8	h
1.6145	1.6196	1.6246	1.6296	1.6346	1.6395	1.6443	1.6492	1.6720	1.6937	1.7144	1.7344	1.7721	1.8072	n
527.8	537.8	547.8	557.8	567.8	577.8	587.8	597.8	647.8	697.8	747.8	797.8	897.8	997.8	t 241
2.35	2.38	2.41	2.44	2.47	2.50	2.53	2.56	2.70	2.84	2.98	3.12	3.39	3.65	v
1277.6	1282.7	1287.8	1292.8	1297.8	1302.9	1307.9	1312.9	1337.7	1362.4	1387.0	1411.6	1460.7	1509.9	h
1.6142	1.6193	1.6243	1.6293	1.6343	1.6392	1.6440	1.6489	1.6717	1.6934	1.7141	1.7341	1.7718	1.8069	n
528.2	538.2	548.2	558.2	568.2	578.2	588.2	598.2	648.2	698.2	748.2	798.2	898.2	998.2	t 242
2.34	2.37	2.40	2.43	2.46	2.49	2.52	2.55	2.69	2.83	2.97	3.11	3.38	3.64	v
1277.7	1282.8	1287.9	1292.9	1297.9	1303.0	1308.0	1313.0	1337.8	1362.5	1387.1	1411.7	1460.8	1510.0	h
1.6139	1.6190	1.6240	1.6290	1.6340	1.6389	1.6437	1.6486	1.6714	1.6931	1.7138	1.7338	1.7715	1.8066	n
528.5	538.5	548.5	558.5	568.5	578.5	588.5	598.5	648.5	698.5	748.5	798.5	898.5	998.5	t 243
2.33	2.36	2.39	2.42	2.45	2.48	2.51	2.54	2.68	2.82	2.96	3.10	3.36	3.63	v
1277.8	1282.9	1288.0	1293.0	1298.1	1303.1	1308.1	1313.1	1337.9	1362.7	1387.3	1411.8	1460.9	1510.2	h
1.6136	1.6187	1.6237	1.6287	1.6337	1.6386	1.6434	1.6483	1.6711	1.6928	1.7135	1.7335	1.7712	1.8063	n
528.9	538.9	548.9	558.9	568.9	578.9	588.9	598.9	648.9	698.9	748.9	798.9	898.9	998.9	t 244
2.32	2.35	2.38	2.41	2.44	2.47	2.50	2.53	2.67	2.81	2.95	3.09	3.35	3.61	v
1277.9	1283.0	1288.1	1293.1	1298.2	1303.2	1308.2	1313.2	1338.1	1362.8	1387.4	1412.0	1461.0	1510.3	h
1.6133	1.6184	1.6234	1.6284	1.6334	1.6383	1.6431	1.6479	1.6707	1.6924	1.7132	1.7331	1.7708	1.8059	n
529.3	539.3	549.3	559.3	569.3	579.3	589.3	599.3	649.3	699.3	749.3	799.3	899.3	999.3	t 245
2.31	2.34	2.37	2.40	2.43	2.46	2.49	2.52	2.66	2.80	2.94	3.08	3.34	3.60	v
1278.0	1283.1	1288.2	1293.2	1298.3	1303.3	1308.3	1313.3	1338.2	1362.9	1387.5	1412.1	1461.2	1510.5	h
1.6130	1.6181	1.6231	1.6281	1.6331	1.6380	1.6428	1.6476	1.6704	1.6921	1.7129	1.7328	1.7705	1.8055	n
529.6	539.6	549.6	559.6	569.6	579.6	589.6	599.6	649.6	699.6	749.6	799.6	899.6	999.6	t 246
2.30	2.33	2.36	2.39	2.42	2.45	2.48	2.51	2.65	2.79	2.93	3.06	3.32	3.58	v
1278.1	1283.2	1288.3	1293.3	1298.4	1303.4	1308.4	1313.4	1338.3	1363.0	1387.6	1412.2	1461.3	1510.6	h
1.6127	1.6178	1.6228	1.6278	1.6327	1.6376	1.6424	1.6473	1.6701	1.6917	1.7125	1.7324	1.7701	1.8051	n
530.0	540.0	550.0	560.0	570.0	580.0	590.0	600.0	650.0	700.0	750.0	800.0	900.0	1000.0	t 247
2.29	2.32	2.35	2.38	2.41	2.44	2.47	2.50	2.64	2.78	2.92	3.05	3.31	3.57	v
1278.2	1283.3	1288.4	1293.4	1298.5	1303.6	1308.6	1313.6	1338.4	1363.2	1387.8	1412.3	1461.4	1510.7	h
1.6124	1.6175	1.6225	1.6275	1.6324	1.6373	1.6421	1.6470	1.6698	1.6914	1.7122	1.7321	1.7698	1.8048	n
530.3	540.3	550.3	560.3	570.3	580.3	590.3	600.3	650.3	700.3	750.3	800.3	900.3	1000.3	t 248
2.28	2.31	2.34	2.37	2.40	2.43	2.46	2.49	2.63	2.77	2.91	3.04	3.30	3.56	v
1278.4	1283.5	1288.6	1293.6	1298.6	1303.7	1308.7	1313.7	1338.6	1363.3	1387.9	1412.4	1461.6	1510.9	h
1.6121	1.6172	1.6222	1.6272	1.6321	1.6370	1.6418	1.6467	1.6695	1.6911	1.7119	1.7318	1.7695	1.8045	n
530.7	540.7	550.7	560.7	570.7	580.7	590.7	600.7	650.7	700.7	750.7	800.7	900.7	1000.7	t 249
2.27	2.30	2.33	2.36	2.39	2.42	2.45	2.48	2.62	2.76	2.90	3.03	3.29	3.54	v
1278.5	1283.6	1288.7	1293.7	1298.7	1303.8	1308.8	1313.8	1338.7	1363.4	1388.0	1412.6	1461.7	1511.0	h
1.6117	1.6168	1.6219	1.6269	1.6318	1.6367	1.6415	1.6463	1.6691	1.6908	1.7115	1.7314	1.7691	1.8041	n

Conversion from Metric Units

1 kg. per sq. cm. = 14.22 lbs. per sq. in. [log = 1.15 300]. 1 cu. meter = 35.31 cu. ft. [log = 1.54 795].
To change degs. C. to degs. F., multiply by $\frac{9}{5}$, and add 32. To change mean kg. calories per kg. to mean B.t.u. per lb., multiply by $\frac{9}{5}$. Entropy same in both systems.

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
250	t	401.0		411.0	421.0	431.0	441.0	451.0	461.0	471.0	481.0	491.0	501.0	511.0	521.0
	v	0.02	1.85	1.88	1.91	1.95	1.98	2.02	2.05	2.08	2.11	2.14	2.17	2.21	2.24
	h	375.2	1201.5	1209.2	1216.3	1223.0	1229.3	1235.4	1241.3	1246.9	1252.3	1257.7	1263.0	1268.2	1273.4
	n	0.5676	1.5276	1.5364	1.5445	1.5521	1.5593	1.5660	1.5723	1.5784	1.5843	1.5900	1.5956	1.6010	1.6062
255	t	402.8		412.8	422.8	432.8	442.8	452.8	462.8	472.8	482.8	492.8	502.8	512.8	522.8
	v	0.02	1.81	1.85	1.88	1.91	1.94	1.98	2.01	2.04	2.07	2.11	2.14	2.17	2.20
	h	377.1	1201.8	1209.5	1216.7	1223.5	1229.8	1235.9	1241.8	1247.4	1252.9	1258.3	1263.6	1268.8	1273.9
	n	0.5698	1.5260	1.5349	1.5431	1.5507	1.5579	1.5646	1.5709	1.5770	1.5829	1.5886	1.5942	1.5996	1.6048
260	t	404.5		414.5	424.5	434.5	444.5	454.5	464.5	474.5	484.5	494.5	504.5	514.5	524.5
	v	0.02	1.78	1.81	1.84	1.87	1.91	1.94	1.97	2.00	2.04	2.07	2.10	2.13	2.16
	h	378.9	1202.1	1209.9	1217.1	1223.9	1230.3	1236.4	1242.3	1247.9	1253.4	1258.8	1264.1	1269.3	1274.5
	n	0.5719	1.5244	1.5334	1.5416	1.5492	1.5564	1.5631	1.5695	1.5756	1.5815	1.5871	1.5926	1.5980	1.6033
265	t	406.2		416.2	426.2	436.2	446.2	456.2	466.2	476.2	486.2	496.2	506.2	516.2	526.2
	v	0.02	1.75	1.78	1.81	1.84	1.88	1.91	1.94	1.97	2.00	2.03	2.06	2.09	2.12
	h	380.7	1202.3	1210.2	1217.5	1224.4	1230.8	1236.9	1242.8	1248.4	1253.9	1259.3	1264.6	1269.8	1275.0
	n	0.5739	1.5229	1.5320	1.5402	1.5479	1.5551	1.5618	1.5682	1.5742	1.5801	1.5858	1.5914	1.5968	1.6020
270	t	407.9		417.9	427.9	437.9	447.9	457.9	467.9	477.9	487.9	497.9	507.9	517.9	527.9
	v	0.02	1.72	1.75	1.78	1.81	1.84	1.87	1.90	1.93	1.96	1.99	2.02	2.05	2.08
	h	382.5	1202.6	1210.6	1217.9	1224.8	1231.3	1237.4	1243.3	1248.9	1254.4	1259.8	1265.2	1270.4	1275.6
	n	0.5760	1.5214	1.5305	1.5388	1.5466	1.5538	1.5605	1.5669	1.5729	1.5788	1.5844	1.5900	1.5954	1.6006
275	t	409.6		419.6	429.6	439.6	449.6	459.6	469.6	479.6	489.6	499.6	509.6	519.6	529.6
	v	0.02	1.69	1.72	1.75	1.78	1.81	1.84	1.87	1.90	1.93	1.96	1.99	2.02	2.04
	h	384.3	1202.9	1210.9	1218.3	1225.3	1231.8	1237.9	1243.8	1249.4	1254.9	1260.3	1265.7	1271.0	1276.1
	n	0.5780	1.5199	1.5291	1.5375	1.5452	1.5524	1.5592	1.5656	1.5716	1.5775	1.5831	1.5886	1.5940	1.5993
280	t	411.2		421.2	431.2	441.2	451.2	461.2	471.2	481.2	491.2	501.2	511.2	521.2	531.2
	v	0.02	1.66	1.69	1.72	1.75	1.78	1.81	1.84	1.87	1.90	1.93	1.95	1.98	2.01
	h	386.0	1203.1	1211.3	1218.7	1225.7	1232.2	1238.4	1244.3	1250.0	1255.5	1260.9	1266.2	1271.4	1276.6
	n	0.5800	1.5185	1.5278	1.5362	1.5440	1.5512	1.5580	1.5643	1.5704	1.5762	1.5819	1.5873	1.5927	1.5980
285	t	412.8		422.8	432.8	442.8	452.8	462.8	472.8	482.8	492.8	502.8	512.8	522.8	532.8
	v	0.02	1.63	1.66	1.69	1.72	1.75	1.78	1.81	1.84	1.87	1.90	1.92	1.95	1.98
	h	387.7	1203.4	1211.6	1219.1	1226.2	1232.7	1238.9	1244.8	1250.5	1256.0	1261.4	1266.7	1271.9	1277.1
	n	0.5820	1.5171	1.5265	1.5349	1.5427	1.5500	1.5567	1.5631	1.5692	1.5750	1.5806	1.5861	1.5915	1.5968
290	t	414.4		424.4	434.4	444.4	454.4	464.4	474.4	484.4	494.4	504.4	514.4	524.4	534.4
	v	0.02	1.60	1.63	1.66	1.69	1.72	1.75	1.78	1.81	1.83	1.86	1.89	1.92	1.94
	h	389.4	1203.6	1211.9	1219.4	1226.6	1233.2	1239.3	1245.2	1250.9	1256.4	1261.8	1267.1	1272.4	1277.6
	n	0.5840	1.5156	1.5251	1.5336	1.5414	1.5487	1.5554	1.5618	1.5679	1.5737	1.5793	1.5848	1.5902	1.5954
295	t	415.9		425.9	435.9	445.9	455.9	465.9	475.9	485.9	495.9	505.9	515.9	525.9	535.9
	v	0.02	1.57	1.60	1.63	1.66	1.69	1.72	1.75	1.78	1.80	1.83	1.86	1.89	1.91
	h	391.1	1203.8	1212.3	1219.8	1227.0	1233.6	1239.8	1245.7	1251.4	1256.9	1262.3	1267.7	1272.9	1278.1
	n	0.5859	1.5142	1.5237	1.5323	1.5402	1.5475	1.5542	1.5606	1.5667	1.5725	1.5781	1.5835	1.5889	1.5942
300	t	417.5		427.5	437.5	447.5	457.5	467.5	477.5	487.5	497.5	507.5	517.5	527.5	537.5
	v	0.02	1.55	1.58	1.60	1.63	1.66	1.69	1.72	1.75	1.78	1.80	1.83	1.86	1.88
	h	392.7	1204.1	1212.6	1220.2	1227.4	1234.1	1240.3	1246.2	1251.9	1257.4	1262.8	1268.2	1273.4	1278.6
	n	0.5878	1.5129	1.5224	1.5310	1.5389	1.5462	1.5530	1.5594	1.5655	1.5713	1.5769	1.5824	1.5878	1.5930
305	t	419.0		429.0	439.0	449.0	459.0	469.0	479.0	489.0	499.0	509.0	519.0	529.0	539.0
	v	0.02	1.53	1.56	1.58	1.61	1.64	1.67	1.69	1.72	1.75	1.78	1.80	1.83	1.85
	h	394.4	1204.3	1212.9	1220.6	1227.8	1234.5	1240.7	1246.6	1252.3	1257.9	1263.3	1268.6	1273.8	1279.0
	n	0.5897	1.5115	1.5212	1.5299	1.5378	1.5451	1.5519	1.5583	1.5644	1.5702	1.5757	1.5812	1.5866	1.5918
310	t	420.5		430.5	440.5	450.5	460.5	470.5	480.5	490.5	500.5	510.5	520.5	530.5	540.5
	v	0.02	1.50	1.53	1.55	1.58	1.61	1.64	1.67	1.69	1.72	1.75	1.78	1.81	1.83
	h	395.9	1204.5	1213.2	1221.0	1228.2	1234.9	1241.1	1247.0	1252.7	1258.3	1263.8	1269.1	1274.3	1279.5
	n	0.5915	1.5102	1.5200	1.5987	1.5366	1.5440	1.5508	1.5572	1.5632	1.5690	1.5746	1.5801	1.5855	1.5907

Degrees of Superheat														Press. lbs.
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	
531.0	541.0	551.0	561.0	571.0	581.0	591.0	601.0	651.0	701.0	751.0	801.0	901.0	1001.0	t 250
2.27	2.30	2.33	2.36	2.38	2.41	2.44	2.47	2.61	2.75	2.88	3.02	3.28	3.53	v
1278.6	1283.7	1288.8	1293.8	1298.9	1303.9	1308.9	1313.9	1338.8	1363.5	1388.1	1412.7	1461.8	1511.2	h
1.6114	1.6165	1.6216	1.6266	1.6315	1.6364	1.6412	1.6460	1.6688	1.6905	1.7112	1.7311	1.7688	1.8038	n
532.8	542.8	552.8	562.8	572.8	582.8	592.8	602.8	652.8	702.8	752.8	802.8	902.8	1002.8	t 255
2.23	2.26	2.28	2.31	2.34	2.37	2.40	2.43	2.56	2.70	2.83	2.96	3.22	3.47	v
1279.1	1284.2	1289.3	1294.4	1299.4	1304.5	1309.5	1314.5	1339.3	1364.1	1388.8	1413.4	1462.5	1511.8	h
1.6100	1.6151	1.6201	1.6251	1.6300	1.6349	1.6397	1.6445	1.6673	1.6890	1.7096	1.7296	1.7671	1.8021	n
534.5	544.5	554.5	564.5	574.5	584.5	594.5	604.5	654.5	704.5	754.5	804.5	904.5	1004.5	t 260
2.19	2.22	2.24	2.27	2.30	2.33	2.36	2.39	2.52	2.65	2.78	2.91	3.16	3.41	v
1279.6	1284.8	1289.9	1294.9	1300.0	1305.1	1310.1	1315.1	1340.0	1364.7	1389.4	1414.0	1463.2	1512.5	h
1.6085	1.6136	1.6186	1.6236	1.6285	1.6334	1.6382	1.6430	1.6658	1.6874	1.7081	1.7280	1.7655	1.8005	n
536.2	546.2	556.2	566.2	576.2	586.2	596.2	606.2	656.2	706.2	756.2	806.2	906.2	1006.2	t 265
2.15	2.18	2.20	2.23	2.26	2.29	2.32	2.35	2.48	2.61	2.74	2.86	3.11	3.35	v
1280.2	1285.3	1290.4	1295.5	1300.5	1305.6	1310.6	1315.6	1340.5	1365.3	1390.0	1414.6	1463.8	1513.2	h
1.6072	1.6123	1.6173	1.6222	1.6271	1.6320	1.6368	1.6416	1.6644	1.6860	1.7066	1.7265	1.7640	1.7990	n
537.9	547.9	557.9	567.9	577.9	587.9	597.9	607.9	657.9	707.9	757.9	807.9	907.9	1007.9	t 270
2.11	2.14	2.16	2.19	2.22	2.25	2.27	2.30	2.43	2.56	2.69	2.81	3.05	3.29	v
1280.7	1285.8	1290.9	1296.0	1301.0	1306.1	1311.1	1316.2	1341.1	1365.9	1390.6	1415.2	1464.5	1513.8	h
1.6058	1.6109	1.6159	1.6209	1.6258	1.6306	1.6354	1.6402	1.6630	1.6846	1.7052	1.7251	1.7625	1.7975	n
539.6	549.6	559.6	569.6	579.6	589.6	599.6	609.6	659.6	709.6	759.6	809.6	909.6	1009.6	t 275
2.07	2.10	2.13	2.16	2.18	2.21	2.24	2.26	2.39	2.52	2.64	2.77	3.00	3.24	v
1281.2	1286.3	1291.4	1296.5	1301.6	1306.7	1311.7	1316.7	1341.6	1366.5	1391.2	1415.8	1465.1	1514.5	h
1.6044	1.6095	1.6145	1.6195	1.6244	1.6292	1.6340	1.6388	1.6616	1.6831	1.7037	1.7236	1.7611	1.7959	n
541.2	551.2	561.2	571.2	581.2	591.2	601.2	611.2	661.2	711.2	761.2	811.2	911.2	1011.2	t 280
2.04	2.07	2.09	2.12	2.15	2.17	2.20	2.22	2.35	2.48	2.60	2.72	2.95	3.19	v
1281.7	1286.8	1291.9	1297.0	1302.1	1307.2	1312.2	1317.2	1342.2	1367.0	1391.7	1416.4	1465.7	1515.1	h
1.6032	1.6083	1.6133	1.6182	1.6231	1.6279	1.6327	1.6375	1.6603	1.6818	1.7024	1.7223	1.7597	1.7945	n
542.8	552.8	562.8	572.8	582.8	592.8	602.8	612.8	662.8	712.8	762.8	812.8	912.8	1012.8	t 285
2.00	2.03	2.06	2.09	2.11	2.14	2.16	2.19	2.31	2.44	2.56	2.68	2.90	3.13	v
1282.2	1287.4	1292.5	1297.6	1302.6	1307.7	1312.7	1317.8	1342.7	1367.5	1392.3	1417.0	1466.3	1515.8	h
1.6020	1.6071	1.6121	1.6170	1.6219	1.6267	1.6315	1.6363	1.6590	1.6805	1.7011	1.7209	1.7583	1.7931	n
544.4	554.4	564.4	574.4	584.4	594.4	604.4	614.4	664.4	714.4	764.4	814.4	914.4	1014.4	t 290
1.97	2.00	2.02	2.05	2.08	2.10	2.13	2.15	2.28	2.40	2.52	2.63	2.86	3.08	v
1282.7	1287.9	1293.0	1298.1	1303.1	1308.2	1313.2	1318.3	1343.2	1368.0	1392.8	1417.5	1466.9	1516.4	h
1.6006	1.6057	1.6107	1.6156	1.6205	1.6253	1.6301	1.6349	1.6576	1.6791	1.6996	1.7195	1.7568	1.7916	n
545.9	555.9	565.9	575.9	585.9	595.9	605.9	615.9	665.9	715.9	765.9	815.9	915.9	1015.9	t 295
1.94	1.97	1.99	2.02	2.04	2.07	2.09	2.12	2.24	2.36	2.48	2.59	2.82	3.04	v
1283.2	1288.4	1293.5	1298.6	1303.6	1308.7	1313.7	1318.8	1343.8	1368.7	1393.4	1418.1	1467.5	1517.0	h
1.5994	1.6045	1.6095	1.6144	1.6192	1.6240	1.6288	1.6336	1.6563	1.6778	1.6983	1.7182	1.7554	1.7902	n
547.5	557.5	567.5	577.5	587.5	597.5	607.5	617.5	667.5	717.5	767.5	817.5	917.5	1017.5	t 300
1.91	1.94	1.96	1.99	2.01	2.04	2.06	2.09	2.21	2.33	2.44	2.55	2.77	2.99	v
1283.7	1288.9	1294.0	1299.1	1304.1	1309.2	1314.2	1319.3	1344.3	1369.2	1393.9	1418.6	1468.0	1517.6	h
1.5981	1.6032	1.6082	1.6131	1.6180	1.6228	1.6275	1.6323	1.6550	1.6765	1.6970	1.7168	1.7541	1.7889	n
549.0	559.0	569.0	579.0	589.0	599.0	609.0	619.0	669.0	719.0	769.0	819.0	919.0	1019.0	t 305
1.88	1.91	1.93	1.96	1.98	2.01	2.03	2.05	2.17	2.29	2.41	2.52	2.73	2.95	v
1284.2	1289.3	1294.4	1299.5	1304.6	1309.7	1314.7	1319.8	1344.8	1369.7	1394.5	1419.2	1468.6	1518.2	h
1.5970	1.6021	1.6070	1.6119	1.6168	1.6216	1.6263	1.6311	1.6538	1.6753	1.6958	1.7156	1.7528	1.7876	n
550.5	560.5	570.5	580.5	590.5	600.5	610.5	620.5	670.5	720.5	770.5	820.5	920.5	1020.5	t 310
1.85	1.88	1.90	1.93	1.95	1.98	2.00	2.02	2.14	2.26	2.37	2.48	2.69	2.90	v
1284.7	1289.8	1294.9	1300.0	1305.1	1310.2	1315.2	1320.3	1345.3	1370.2	1395.0	1419.7	1469.2	1518.8	h
1.5958	1.6009	1.6059	1.6108	1.6156	1.6204	1.6252	1.6299	1.6526	1.6741	1.6946	1.7144	1.7516	1.7863	n

Table 3: Superheated Steam

Press. lbs.		Water	Sat. Steam	Degrees of Superheat 10°	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
320	t	423.4		433.4	443.4	453.4	463.4	473.4	483.4	493.4	503.4	513.4	523.4	533.4	543.4
	v	0.02	1.46	1.49	1.51	1.53	1.56	1.59	1.62	1.64	1.67	1.70	1.72	1.75	1.77
	h	399.1	1204.9	1213.8	1221.7	1229.0	1235.7	1242.0	1248.0	1253.7	1259.3	1264.7	1270.0	1275.2	1280.4
	n	0.5951	1.5076	1.5176	1.5264	1.5344	1.5418	1.5486	1.5550	1.5610	1.5668	1.5723	1.5778	1.5832	1.5884
330	t	426.3		436.3	446.3	456.3	466.3	476.3	486.3	496.3	506.3	516.3	526.3	536.3	546.3
	v	0.02	1.41	1.44	1.46	1.49	1.52	1.54	1.57	1.60	1.62	1.65	1.67	1.70	1.72
	h	402.2	1205.3	1214.4	1222.5	1229.8	1236.6	1242.9	1248.9	1254.6	1260.2	1265.6	1270.9	1276.2	1281.4
	n	0.5986	1.5051	1.5153	1.5242	1.5322	1.5396	1.5464	1.5528	1.5588	1.5647	1.5702	1.5756	1.5809	1.5861
340	t	429.1		439.1	449.1	459.1	469.1	479.1	489.1	499.1	509.1	519.1	529.1	539.1	549.1
	v	0.02	1.37	1.40	1.42	1.44	1.47	1.50	1.53	1.55	1.57	1.60	1.63	1.65	1.67
	h	405.3	1205.7	1215.0	1223.2	1230.6	1237.4	1243.8	1249.8	1255.5	1261.1	1266.5	1271.8	1277.1	1282.3
	n	0.6020	1.5026	1.5130	1.5220	1.5301	1.5375	1.5443	1.5507	1.5568	1.5625	1.5681	1.5735	1.5789	1.5841
350	t	431.9		441.9	451.9	461.9	471.9	481.9	491.9	501.9	511.9	521.9	531.9	541.9	551.9
	v	0.02	1.33	1.36	1.38	1.40	1.43	1.46	1.48	1.51	1.54	1.56	1.58	1.61	1.63
	h	408.3	1206.1	1215.6	1223.9	1231.4	1238.2	1244.6	1250.6	1256.3	1261.9	1267.3	1272.7	1278.0	1283.2
	n	0.6053	1.5002	1.5108	1.5199	1.5280	1.5355	1.5423	1.5487	1.5547	1.5605	1.5660	1.5715	1.5768	1.5820
360	t	434.6		444.6	454.6	464.6	474.6	484.6	494.6	504.6	514.6	524.6	534.6	544.6	554.6
	v	0.02	1.30	1.32	1.34	1.37	1.40	1.42	1.44	1.46	1.48	1.52	1.54	1.56	1.59
	h	411.2	1206.4	1216.1	1224.5	1232.2	1239.0	1245.4	1251.4	1257.2	1262.8	1268.2	1273.6	1278.9	1284.1
	n	0.6085	1.4979	1.5087	1.5179	1.5261	1.5336	1.5404	1.5468	1.5528	1.5586	1.5641	1.5695	1.5749	1.5801
370	t	437.2		447.2	457.2	467.2	477.2	487.2	497.2	507.2	517.2	527.2	537.2	547.2	557.2
	v	0.02	1.26	1.29	1.31	1.33	1.36	1.38	1.41	1.43	1.46	1.48	1.50	1.52	1.55
	h	414.0	1206.8	1216.7	1225.2	1232.9	1239.8	1246.2	1252.3	1258.0	1263.6	1269.1	1274.4	1279.7	1284.9
	n	0.6116	1.4956	1.5067	1.5160	1.5243	1.5318	1.5386	1.5450	1.5510	1.5568	1.5623	1.5677	1.5730	1.5782
380	t	439.8		449.8	459.8	469.8	479.8	489.8	499.8	509.8	519.8	529.8	539.8	549.8	559.8
	v	0.02	1.23	1.25	1.27	1.30	1.32	1.35	1.37	1.40	1.42	1.44	1.47	1.49	1.51
	h	416.8	1207.1	1217.2	1225.9	1233.6	1240.6	1247.0	1253.1	1258.9	1264.5	1269.9	1275.3	1280.6	1285.8
	n	0.6147	1.4935	1.5048	1.5142	1.5226	1.5301	1.5370	1.5433	1.5493	1.5550	1.5605	1.5659	1.5713	1.5765
390	t	442.3		452.3	462.3	472.3	482.3	492.3	502.3	512.3	522.3	532.3	542.3	552.3	562.3
	v	0.02	1.20	1.22	1.24	1.26	1.29	1.32	1.34	1.36	1.38	1.41	1.43	1.45	1.47
	h	419.5	1207.4	1217.8	1226.6	1234.4	1241.4	1247.8	1253.9	1259.7	1265.3	1270.7	1276.1	1281.4	1286.6
	n	0.6178	1.4915	1.5029	1.5124	1.5209	1.5282	1.5353	1.5417	1.5476	1.5533	1.5588	1.5642	1.5695	1.5747
400	t	444.7		454.7	464.7	474.7	484.7	494.7	504.7	514.7	524.7	534.7	544.7	554.7	564.7
	v	0.02	1.17	1.19	1.21	1.23	1.26	1.28	1.31	1.33	1.35	1.37	1.40	1.42	1.44
	h	422.2	1207.7	1218.3	1227.2	1235.1	1242.1	1248.6	1254.7	1260.5	1266.1	1271.5	1276.9	1282.2	1287.5
	n	0.6208	1.4894	1.5010	1.5107	1.5192	1.5267	1.5336	1.5399	1.5459	1.5516	1.5571	1.5625	1.5678	1.5730
450	t	456.5		466.5	476.5	486.5	496.5	506.5	516.5	526.5	536.5	546.5	556.5	566.5	576.5
	v	0.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.19	1.21	1.23	1.25	1.27	1.29
	h	435.	1209.	1221.	1231.	1239.	1246.	1252.	1258.	1264.	1270.	1276.	1281.	1286.	1291.
	n	0.635	1.479	1.492	1.502	1.511	1.519	1.526	1.532	1.538	1.544	1.549	1.554	1.560	1.565
500	t	467.2		477.2	487.2	497.2	507.2	517.2	527.2	537.2	547.2	557.2	567.2	577.2	587.2
	v	0.02	0.93	0.95	0.97	0.99	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.17
	h	448.	1210.	1223.	1233.	1242.	1249.	1256.	1262.	1268.	1274.	1279.	1285.	1290.	1295.
	n	0.648	1.471	1.486	1.497	1.506	1.513	1.520	1.526	1.532	1.538	1.543	1.549	1.554	1.559
550	t	477.2		487.2	497.2	507.2	517.2	527.2	537.2	547.2	557.2	567.2	577.2	587.2	597.2
	v	0.02	0.85	0.87	0.89	0.91	0.93	0.94	0.96	0.98	1.00	1.01	1.03	1.05	1.07
	h	458.	1210.	1225.	1236.	1245.	1253.	1260.	1266.	1272.	1277.	1283.	1288.	1293.	1299.
	n	0.659	1.462	1.479	1.491	1.501	1.509	1.516	1.522	1.528	1.533	1.539	1.544	1.549	1.554
600	t	486.4		496.4	506.4	516.4	526.4	536.4	546.4	556.4	566.4	576.4	586.4	596.4	606.4
	v	0.02	0.78	0.79	0.81	0.83	0.85	0.86	0.88	0.90	0.92	0.93	0.95	0.97	0.98
	h	469.	1211.	1228.	1240.	1250.	1257.	1264.	1270.	1276.	1282.	1288.	1293.	1298.	1304.
	n	0.670	1.454	1.473	1.486	1.496	1.504	1.510	1.516	1.522	1.528	1.533	1.538	1.543	1.548

Degrees of Superheat														
130°	140°	150°	160°	170°	180°	190°	200°	250°	300°	350°	400°	500°	600°	Press. lbs.
553.4	563.4	573.4	583.4	593.4	603.4	613.4	623.4	673.4	723.4	773.4	823.4	923.4	1023.4	t 320
1.80	1.82	1.85	1.87	1.90	1.92	1.94	1.96	2.08	2.19	2.30	2.41	2.61	2.81	v
1285.6	1290.7	1295.9	1301.0	1306.1	1311.1	1316.2	1321.3	1346.3	1371.3	1396.1	1420.8	1470.3	1520.0	h
1.5935	1.5986	1.6036	1.6085	1.6133	1.6181	1.6228	1.6276	1.6503	1.6717	1.6922	1.7120	1.7491	1.7898	n
556.3	566.3	576.3	586.3	596.3	606.3	616.3	626.3	676.3	726.3	776.3	826.3	926.3	1026.3	t 330
1.75	1.77	1.80	1.82	1.84	1.86	1.89	1.91	2.02	2.13	2.24	2.34	2.54	2.74	v
1286.5	1291.7	1296.8	1301.9	1307.0	1312.1	1317.2	1322.2	1347.3	1372.3	1397.1	1421.9	1471.5	1521.2	h
1.5913	1.5964	1.6014	1.6063	1.6111	1.6159	1.6206	1.6253	1.6480	1.6694	1.6899	1.7097	1.7467	1.7814	n
559.1	569.1	579.1	589.1	599.1	609.1	619.1	629.1	679.1	729.1	779.1	829.1	929.1	1029.1	t 340
1.70	1.72	1.75	1.77	1.79	1.81	1.84	1.86	1.97	2.08	2.18	2.28	2.47	2.67	v
1287.4	1292.6	1297.8	1302.9	1308.0	1313.0	1318.1	1323.2	1348.3	1373.3	1398.2	1423.0	1472.6	1522.3	h
1.5892	1.5942	1.5992	1.6041	1.6089	1.6137	1.6184	1.6231	1.6458	1.6671	1.6876	1.7074	1.7444	1.7790	n
561.9	571.9	581.9	591.9	601.9	611.9	621.9	631.9	681.9	731.9	781.9	831.9	931.9	1031.9	t 350
1.65	1.68	1.70	1.72	1.74	1.77	1.79	1.81	1.92	2.02	2.12	2.22	2.41	2.60	v
1288.3	1293.5	1298.7	1303.8	1308.9	1313.9	1319.0	1324.1	1349.3	1374.3	1399.2	1424.0	1473.7	1523.5	h
1.5871	1.5921	1.5971	1.6020	1.6068	1.6116	1.6163	1.6210	1.6436	1.6650	1.6854	1.7052	1.7422	1.7767	n
564.6	574.6	584.6	594.6	604.6	614.6	624.6	634.6	684.6	734.6	784.6	834.6	934.6	1034.6	t 360
1.61	1.63	1.65	1.68	1.70	1.72	1.74	1.76	1.87	1.97	2.07	2.16	2.35	2.53	v
1289.2	1294.4	1299.6	1304.7	1309.8	1314.9	1319.9	1325.0	1350.2	1375.3	1400.2	1425.0	1474.8	1524.6	h
1.5852	1.5902	1.5951	1.6000	1.6048	1.6096	1.6143	1.6190	1.6415	1.6629	1.6833	1.7031	1.7400	1.7745	n
567.2	577.2	587.2	597.2	607.2	617.2	627.2	637.2	687.2	737.2	787.2	837.2	937.2	1037.2	t 370
1.57	1.59	1.61	1.64	1.66	1.68	1.70	1.72	1.82	1.92	2.02	2.11	2.30	2.47	v
1290.1	1295.3	1300.4	1305.6	1310.7	1315.8	1320.8	1325.9	1351.1	1376.2	1401.2	1426.1	1475.8	1525.7	h
1.5833	1.5883	1.5933	1.5982	1.6030	1.6077	1.6124	1.6171	1.6396	1.6610	1.6814	1.7011	1.7380	1.7725	n
569.8	579.8	589.8	599.8	609.8	619.8	629.8	639.8	689.8	739.8	789.8	839.8	939.8	1039.8	t 380
1.53	1.55	1.58	1.60	1.62	1.64	1.66	1.68	1.78	1.88	1.97	2.06	2.24	2.41	v
1290.9	1296.1	1301.3	1306.5	1311.6	1316.7	1321.7	1326.8	1352.0	1377.1	1402.1	1427.0	1476.9	1526.8	h
1.5816	1.5866	1.5915	1.5964	1.6012	1.6059	1.6106	1.6153	1.6378	1.6591	1.6795	1.6992	1.7361	1.7705	n
572.3	582.3	592.3	602.3	612.3	622.3	632.3	642.3	692.3	742.3	792.3	842.3	942.3	1042.3	t 390
1.50	1.52	1.54	1.56	1.58	1.60	1.62	1.64	1.74	1.83	1.92	2.01	2.19	2.35	v
1291.8	1297.0	1302.2	1307.3	1312.4	1317.5	1322.6	1327.7	1353.0	1378.1	1403.1	1428.0	1477.9	1527.9	h
1.5798	1.5848	1.5897	1.5946	1.5994	1.6041	1.6088	1.6135	1.6360	1.6573	1.6777	1.6973	1.7342	1.7685	n
574.7	584.7	594.7	604.7	614.7	624.7	634.7	644.7	694.7	744.7	794.7	844.7	944.7	1044.7	t 400
1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.70	1.79	1.88	1.97	2.14	2.30	v
1292.7	1297.9	1303.0	1308.2	1313.3	1318.4	1323.5	1328.6	1353.9	1379.1	1404.1	1429.0	1478.9	1528.9	h
1.5781	1.5821	1.5880	1.5929	1.5977	1.6024	1.6070	1.6117	1.6342	1.6554	1.6758	1.6955	1.7323	1.7666	n
586.5	596.5	606.5	616.5	626.5	636.5	646.5	656.5	706.5	756.5	806.5	856.5	956.5	1056.5	t 450
1.31	1.33	1.35	1.36	1.38	1.40	1.42	1.44	1.53	1.61	1.69	1.77	1.93	2.07	v
1297.	1302.	1307.	1312.	1317.	1323.	1328.	1333.	1358.	1383.	1409.	1434.	1484.	1534.	h
1.570	1.575	1.580	1.585	1.589	1.594	1.599	1.603	1.626	1.647	1.667	1.687	1.723	1.758	n
597.2	607.2	617.2	627.2	637.2	647.2	657.2	667.2	717.2	767.2	817.2	867.2	967.2	1067.2	t 500
1.19	1.20	1.22	1.24	1.26	1.27	1.29	1.31	1.39	1.47	1.54	1.62	1.76	1.89	v
1300.	1306.	1311.	1316.	1321.	1327.	1332.	1337.	1362.	1388.	1413.	1438.	1489.	1539.	h
1.564	1.569	1.574	1.579	1.584	1.589	1.594	1.598	1.620	1.641	1.661	1.680	1.716	1.751	n
607.2	617.2	627.2	637.2	647.2	657.2	667.2	677.2	727.2	777.2	827.2	877.2	977.2	1077.2	t 550
1.08	1.10	1.11	1.13	1.15	1.16	1.18	1.20	1.27	1.34	1.42	1.49	1.62	1.74	v
1304.	1309.	1315.	1320.	1325.	1330.	1336.	1341.	1366.	1392.	1417.	1442.	1493.	1543.	h
1.559	1.564	1.569	1.574	1.579	1.583	1.588	1.592	1.615	1.636	1.656	1.675	1.711	1.746	n
616.4	626.4	636.4	646.4	656.4	666.4	676.4	686.4	736.4	786.4	836.4	886.4	986.4	1086.4	t 600
1.00	1.02	1.03	1.05	1.06	1.08	1.09	1.11	1.18	1.25	1.31	1.38	1.50	1.62	v
1309.	1314.	1319.	1325.	1330.	1335.	1340.	1346.	1371.	1397.	1422.	1448.	1499.	1550.	h
1.553	1.558	1.563	1.568	1.573	1.577	1.582	1.586	1.608	1.629	1.649	1.668	1.704	1.739	n

Table 4. Increase in Total Heat and in Entropy for Steam Superheated above 600°

Press. lbs.		From 600° Fahr. superheat to 700°	800°	900°	1000°	1100°	1200°	1300°	1400°	1500°	1600°	1700°	1800°	1900°	2000°		Press. lbs.
1	Δh	47.	95.	143.	192.	242.	292.	343.	394.	446.	500.	554.	610.	667.	726.	Δh	1
	Δn	0.039	0.075	0.110	0.142	0.172	0.202	0.230	0.257	0.283	0.308	0.333	0.357	0.381	0.404	Δn	
15	Δh	48.	96.	145.	194.	244.	295.	347.	400.	453.	508.	564.	621.	680.	741.	Δh	15
	Δn	0.036	0.070	0.102	0.133	0.162	0.190	0.216	0.242	0.268	0.292	0.316	0.340	0.364	0.387	Δn	
25	Δh	48.	96.	145.	195.	246.	297.	349.	402.	455.	510.	566.	624.	684.	745.	Δh	25
	Δn	0.036	0.069	0.101	0.131	0.160	0.188	0.214	0.240	0.266	0.290	0.313	0.337	0.361	0.384	Δn	
50	Δh	48.	97.	146.	196.	247.	299.	351.	404.	459.	514.	571.	630.	690.	752.	Δh	50
	Δn	0.035	0.068	0.099	0.128	0.156	0.184	0.210	0.236	0.260	0.285	0.308	0.332	0.355	0.378	Δn	
75	Δh	48.	97.	147.	197.	248.	300.	353.	406.	461.	517.	574.	633.	694.	756.	Δh	75
	Δn	0.035	0.067	0.098	0.127	0.154	0.182	0.208	0.234	0.258	0.283	0.306	0.330	0.353	0.376	Δn	
100	Δh	48.	98.	148.	198.	249.	301.	354.	408.	463.	519.	577.	636.	697.	759.	Δh	100
	Δn	0.034	0.066	0.097	0.126	0.153	0.181	0.207	0.232	0.256	0.281	0.304	0.328	0.351	0.374	Δn	
150	Δh	49.	99.	149.	200.	251.	303.	356.	411.	467.	524.	582.	642.	703.	765.	Δh	150
	Δn	0.034	0.065	0.095	0.124	0.151	0.178	0.204	0.229	0.253	0.277	0.301	0.324	0.347	0.370	Δn	
200	Δh	49.	99.	150.	201.	253.	305.	358.	413.	470.	527.	586.	646.	708.	771.	Δh	200
	Δn	0.033	0.065	0.094	0.123	0.150	0.177	0.203	0.228	0.252	0.276	0.300	0.323	0.346	0.369	Δn	
250	Δh	50.	100.	151.	202.	254.	306.	360.	415.	472.	530.	589.	649.	712.	776.	Δh	250
	Δn	0.033	0.064	0.094	0.122	0.150	0.176	0.202	0.226	0.251	0.275	0.298	0.322	0.345	0.368	Δn	
300	Δh	50.	100.	151.	203.	255.	308.	362.	417.	474.	532.	591.	652.	715.	780.	Δh	300
	Δn	0.033	0.064	0.093	0.122	0.149	0.175	0.201	0.225	0.250	0.274	0.297	0.320	0.344	0.367	Δn	
400	Δh	50.	101.	152.	204.	257.	311.	365.	421.	478.	537.	597.	659.	722.	787.	Δh	400
	Δn	0.032	0.063	0.092	0.120	0.147	0.173	0.199	0.223	0.248	0.271	0.295	0.318	0.341	0.364	Δn	
500	Δh	51.	102.	154.	206.	259.	313.	368.	424.	482.	541.	602.	664.	728.	794.	Δh	500
	Δn	0.032	0.063	0.092	0.120	0.147	0.173	0.198	0.222	0.247	0.270	0.294	0.317	0.340	0.363	Δn	
600	Δh	51.	103.	155.	208.	261.	315.	371.	427.	485.	545.	606.	669.	734.	800.	Δh	600
	Δn	0.032	0.062	0.091	0.119	0.146	0.172	0.197	0.222	0.246	0.270	0.293	0.317	0.340	0.363	Δn	

This table gives, either directly or by interpolation, the excess of the total heat or entropy at any given pressure and superheat above that at the same pressure and 600° superheat. The actual total heat or entropy is obtained by adding this increment to the corresponding value in the 600° column of Table 3.

Table 5. Boiling Points For Thermometer Calibrations

English Units

Press. in. of Hg.	Temp. Fahr.	Press. in. of Hg.	Temp. Fahr.	Press. in. of Hg.	Temp. Fahr.	Press. in. of Hg.	Temp. Fahr.	Press. in. of Hg.	Temp. Fahr.
22.0	196.95	25.0	203.10	28.0	208.67	29.5	211.27	31.0	213.80
.2	197.37	.2	203.48	.1	208.85	.6	211.44	.1	213.96
.4	197.79	.4	203.86	.2	209.03	.7	211.62	.2	214.13
.6	198.21	.6	204.24	.3	209.20	.8	211.79	.3	214.29
.8	198.63	.8	204.62	.4	209.37	.9	211.96	.4	214.46
23.0	199.05	26.0	205.00	28.5	209.55	30.0	212.13	31.5	214.62
.2	199.47	.2	205.38	.6	209.73	.1	212.30	.6	214.79
.4	199.89	.4	205.75	.7	209.91	.2	212.47	.7	214.95
.6	200.31	.6	206.12	.8	210.08	.3	212.64	.8	215.11
.8	200.72	.8	206.49	.9	210.25	.4	212.81	.9	215.27
24.0	201.13	27.0	206.86	29.0	210.42	30.5	212.97	32.0	215.43
.2	201.54	.2	207.23	.1	210.59	.6	213.13	.2	215.75
.4	201.94	.4	207.59	.2	210.76	.7	213.30	.4	216.08
.6	202.33	.6	207.95	.3	210.93	.8	213.46	.6	216.40
.8	202.72	.8	208.31	.4	211.10	.9	213.63	.8	216.72

Metric Units

Press. mm. of Hg.	Temp. Cent.	Press. mm. of Hg.	Temp. Cent.	Press. mm. of Hg.	Temp. Cent.	Press. mm. of Hg.	Temp. Cent.	Press. mm. of Hg.	Temp. Cent.
550	91.19	700	97.71	725	98.68	750	99.63	775	100.55
60	91.67	1	97.75	6	98.72	1	99.66	6	100.59
70	92.14	2	97.79	7	98.76	2	99.70	7	100.62
80	92.60	3	97.83	8	98.80	3	99.74	8	100.66
90	93.06	4	97.87	9	98.84	4	99.78	9	100.69
600	93.51	705	97.91	730	98.87	755	99.81	780	100.73
05	93.73	6	97.95	1	98.91	6	99.85	1	100.77
10	93.96	7	97.99	2	98.95	7	99.89	2	100.80
15	94.18	8	98.03	3	98.99	8	99.92	3	100.84
20	94.40	9	98.07	4	99.03	9	99.96	4	100.87
625	94.61	710	98.10	735	99.06	760	100.00	785	100.91
30	94.83	1	98.14	6	99.10	1	100.04	6	100.95
35	95.04	2	98.18	7	99.14	2	100.07	7	100.98
40	95.25	3	98.22	8	99.18	3	100.11	8	101.02
45	95.47	4	98.26	9	99.21	4	100.15	9	101.05
650	95.68	715	98.30	740	99.25	765	100.18	790	101.09
55	95.89	6	98.34	1	99.29	6	100.22	1	101.12
60	96.10	7	98.38	2	99.33	7	100.26	2	101.16
65	96.30	8	98.41	3	99.36	8	100.29	3	101.20
70	96.51	9	98.45	4	99.40	9	100.33	4	101.23
675	96.71	720	98.49	745	99.44	770	100.37	795	101.27
80	96.91	1	98.53	6	99.48	1	100.40	6	101.30
85	97.12	2	98.57	7	99.51	2	100.44	7	101.34
90	97.32	3	98.61	8	99.55	3	100.48	8	101.37
95	97.52	4	98.65	9	99.59	4	100.51	9	101.41

Table 6. Thermal Properties of Water
At Saturation Pressure

Temp. Fahr.	Press. lbs.	Specific Volume ft.³/lb.	Specific Volume cm.³/gr.	Density lbs./ft.³	Density grs./cm.³	144 Apv' B. t. u.	Specific Heat	Temp. Fahr.
20°	0.06	0.01603	1.00101	62.37	0.99899	0.000	1.0168	20°
30	0.08	0.01602	1.00022	62.42	0.99978	0.000	1.0098	30
40	0.12	0.01602	1.00000	62.43	1.00000	0.000	1.0045	40
50°	0.18	0.01602	1.00027	62.42	0.99973	0.001	1.0012	50°
60	0.26	0.01603	1.00096	62.37	0.99904	0.001	0.9990	60
70	0.36	0.01605	1.00201	62.30	0.99799	0.001	0.9977	70
80	0.51	0.01607	1.00338	62.22	0.99663	0.002	0.9970	80
90	0.70	0.01610	1.00504	62.11	0.99498	0.002	0.9967	90
100°	0.95	0.01613	1.00698	62.00	0.99307	0.003	0.9967	100°
110	1.27	0.01616	1.00915	61.86	0.99093	0.004	0.9970	110
120	1.69	0.01620	1.01157	61.71	0.98857	0.005	0.9974	120
130	2.22	0.01625	1.01420	61.55	0.98600	0.007	0.9979	130
140	2.89	0.01629	1.01705	61.38	0.98324	0.009	0.9986	140
150°	3.71	0.01634	1.02011	61.20	0.98029	0.011	0.9994	150°
160	4.74	0.01639	1.02337	61.00	0.97717	0.014	1.0002	160
170	5.99	0.01645	1.02682	60.80	0.97388	0.018	1.0010	170
180	7.51	0.01651	1.03047	60.58	0.97043	0.023	1.0019	180
190	9.34	0.01657	1.03431	60.36	0.96683	0.029	1.0029	190
200°	11.52	0.01663	1.03835	60.12	0.96307	0.036	1.0039	200°
210	14.13	0.01670	1.04256	59.88	0.95917	0.044	1.0050	210
220*	17.19	0.01677	1.0469	59.63	0.9552	0.054	1.007*	220
230	20.77	0.01684	1.0515	59.37	0.9510	0.065	1.009*	230
240	24.97	0.01692	1.0562	59.11	0.9468	0.078	1.012*	240
250°	29.82	0.01700	1.0611	58.83	0.9425	0.094	1.015*	250°
260	35.42	0.01708	1.0662	58.55	0.9379	0.112	1.018	260
270	41.85	0.01716	1.0715	58.26	0.9332	0.133	1.021	270
280	49.18	0.01725	1.0771	57.96	0.9284	0.157	1.023	280
290	57.55	0.01735	1.0830	57.65	0.9234	0.185	1.026	290
300°	67.00	0.01744	1.0890	57.33	0.9183	0.217	1.029	300°
310	77.67	0.01754	1.0953	57.00	0.9130	0.254	1.032	310
320	89.63	0.01765	1.1019	56.66	0.9075	0.295	1.035	320
330	103.0	0.01776	1.1088	56.30	0.9019	0.340	1.038	330
340	118.0	0.01788	1.1160	55.94	0.8961	0.391	1.041	340

* Values below 220° from mean curve described on page 89. Values above 250° from Dieterici's formula. The four values indicated are selected so as to give a smooth transition.

Table 6: Water

Temp. Fahr.	Press. lbs.	Specific Volume ft.³/lb.	Specific Volume cm.³/gr.	Density lbs./ft.³	Density grs./cm.³	144 Apv' B. t. u.	Specific Heat	Temp. Fahr.
350°	135.	0.01800	1.1235	55.57	0.8902	0.448	1.045	350°
360	153.	0.01812	1.1313	55.18	0.8840	0.513	1.048	360
370	173.	0.01825	1.1396	54.78	0.8776	0.586	1.052	370
380	196.	0.01839	1.1483	54.36	0.8709	0.666	1.056	380
390	220.	0.01854	1.1573	53.94	0.8642	0.756	1.060	390
400°	247.	0.0187	1.167	53.5	0.857	0.86	1.064	400°
410	276.	0.0189	1.177	53.0	0.850	0.96	1.068	410
420	308.	0.0190	1.187	52.6	0.843	1.09	1.072	420
430	343.	0.0192	1.197	52.2	0.835	1.22	1.077	430
440	381.	0.0194	1.208	51.7	0.828	1.36	1.082	440
450°	422.	0.0195	1.220	51.2	0.820	1.52	1.086	450°
460	466.	0.0197	1.232	50.7	0.812	1.70	1.091	460
470	514.	0.0199	1.244	50.2	0.804	1.89	1.096	470
480	565.	0.0201	1.256	49.7	0.796	2.10	1.101	480
490	620.	0.0203	1.269	49.2	0.787	2.33	1.106	490
500°	679.	0.0206	1.283	48.7	0.779	2.58	1.112	500°
510	743.	0.0208	1.297	48.1	0.771	2.86	1.117	510
520	810.	0.0210	1.312	47.6	0.763	3.15	1.123	520
530	883.	0.0213	1.329	47.0	0.755	3.48	1.128	530
540	960.	0.0216	1.35	46.3	0.74	3.8	1.134	540
550°	1043.	0.0219	1.37	45.6	0.73	4.2	1.140	550°
560	1130.	0.0223	1.39	44.9	0.71	4.7	1.146	560
570	1224.	0.0227	1.42	44.1	0.70	5.2	1.152	570
580	1323.	0.0231	1.44	43.3	0.69	5.7	1.158	580
590	1428.	0.0235	1.46	42.6	0.68	6.2	1.165	590
600°	1540.	0.024	1.49	41.8	0.67	6.8	1.172	600°
610	1658.	0.024*	1.52*	41.0*	0.66*	7.5*		610
620	1783.	0.025	1.55	40.2	0.65	8.2		620
630	1916.	0.025	1.59	39.4	0.64	9.0		630
640	2056.	0.026	1.63	38.5	0.62	9.9		640
650°	2204.	0.027	1.67	37.5	0.60	10.9		650°
660	2361.	0.027	1.72	36.4	0.58	12.0		660
670	2526.	0.028	1.78	35.2	0.56	13.3		670
690	2883.	0.031	1.95	32.1	0.51	16.6		690
706.1	3200.	0.050	3.11	20.1	0.32	29.5		706.1

* The specific volumes and densities below 600° were taken from the 3rd (1905) edition of Landolt and Börnstein's "Physikalische Tabellen." These and the following values were obtained by the method described on page 103.

Conversion Tables

Temperature

TABLE OF EQUIVALENT TEMPERATURES

Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.	Cent.	Fahr.
−25°	−13°	50°	122°	125°	257°	200°	392°	275°	527°	350°	662°	425°	797°
−20	− 4	55	131	130	266	205	401	280	536	355	671	430	806
−15	+ 5	60	140	135	275	210	410	285	545	360	680	435	815
−10	14	65	149	140	284	215	419	290	554	365	689	440	824
− 5	23	70	158	145	293	220	428	295	563	370	698	445	833
0°	32°	75°	167°	150°	302°	225°	437°	300°	572°	375°	707°	450°	842°
5	41	80	176	155	311	230	446	305	581	380	716	455	851
10	50	85	185	160	320	235	455	310	590	385	725	460	860
15	59	90	194	165	329	240	464	315	599	390	734	465	869
20	68	95	203	170	338	245	473	320	608	395	743	470	878
25°	77°	100°	212°	175°	347°	250°	482°	325°	617°	400°	752°	475°	887°
30	86	105	221	180	356	255	491	330	626	405	761	480	896
35	95	110	230	185	365	260	500	335	635	410	770	485	905
40	104	115	239	190	374	265	509	340	644	415	779	490	914
45	113	120	248	195	383	270	518	345	653	420	788	495	923

TABLE OF VALUES FOR INTERPOLATION IN ABOVE

1°C = 1.8°F	4°C = 7.2°F	7°C = 12.6°F		1°F = 0.55°C	4°F = 2.22°C	7°F = 3.88°C
2 = 3.6	5 = 9.0	8 = 14.4		2 = 1.11	5 = 2.77	8 = 4.44
3 = 5.4	6 = 10.8	9 = 16.2		3 = 1.66	6 = 3.33	9 = 5.00
All decimals are exact.				All decimals are repeating decimals.		

Length area and volume

1 cm.	= 0.3937*	inches,	log = $\bar{1}$.59 517	1 inch	= 2.54001	cm.,	log = 0.40 483
1 meter	= 3.28083	ft.,	0.51 598	1 ft.	= 0.30480	m.,	$\bar{1}$.48 402
1 sq. cm.	= 0.15500	sq. in.,	$\bar{1}$.19 033	1 sq. in.	= 6.4516	sq. cm.,	0.80 967
1 sq. meter	= 10.7639	sq. ft.,	1.03 197	1 sq. ft.	= 0.092903	sq. m.,	$\bar{2}$.96 803
1 cu. cm.	= 0.061023	cu. in.,	$\bar{2}$.78 550	1 cu. in.	= 16.387	cu. cm.,	1.21 450
1 cu. meter	= 35.3145	cu. ft.,	1.54 795	1 cu. ft.	= 0.028317	cu. m.,	$\bar{2}$.45 205
1 liter	= 0.26417	gals.,	$\bar{1}$.42 188	1 gal.	= 3.7854	liters,	0.57 812

Mass and density

1 kg.	= 2.204622	lbs.,	log = 0.34 333	1 lb.	= 0.453592	kg.,	log = $\bar{1}$.65 667
1 gr./cm.^{3},	= 62.4283	lbs./ft.^{3},	1.79 538	1 lb./ft.^{3}	= 0.016018	gr./cm.^{3},	$\bar{2}$.20 462
Density of Hg.	= 0.491170	lbs./in.^{3} (at 32°),	$\bar{1}$.69 123	Den. of Hg.	= 13.59545	gr./cm.^{3} (at 0° C.),	1.33 339
g (standard)	= 32.1740	ft. sec.$^{-2}$,	1.50 750	g (standard)	= 980.665*	cm. sec.$^{-2}$,	2.99 152

Pressure

1 kg./cm.^{2}	= 14.223	lbs./in.^{2},	log = 1.15 300	1 lb./in.^{2}	= 0.070307	kg./cm.^{2},	log = $\bar{2}$.84 700
("metric	= 28.958	in. of Hg.,	1.46 177		= 2.0360	in. of Hg.,	0.30 877
atmosphere")	= 735.54	mm. of Hg.,	2.86 661		= 51.713	mm. of Hg.,	1.71 360
	= 32.84	ft. of H_2O (at 60°),	1.51 640		= 27.71	ins. of H_2O (at 60°),	1.44 258
	= 0.9678	atmos,	$\bar{1}$.98 579		= 0.068044	atmos,	$\bar{2}$.83 279
	= 0.980665*	megabars,†	$\bar{1}$.99 152		= 0.068947	megabars,†	$\bar{2}$.83 852
1000 mm. of Hg.	= 1.3158	atmos,	log = 0.11 919	1 atmo	= 760.*	mm. of Hg.,	log = 2.88 081
	= 39.37*	in. of Hg.,	1.59 517		= 29.921	in. of Hg.,	1.47 598
	= 44.65	ft. of H_2O (at 60°),	1.64 979		= 33.93	ft. of H_2O (at 60°),	1.53 061
	= 19.337	lbs./in.^{2},	1.28 640		= 14.696	lbs/in.^{2},	1.16 721
	= 1.3595	kg./cm.^{2}	0.13 339		= 1.0333	kg./cm.^{2},	0.01 421
	= 1.3333	megabars,†	0.12 491		= 1.0133	megabars,†	0.00 573

* Exact value, by definition.

† 1 megabar = 10^6 dynes per sq. cm.

Conversion Table

Energy

1 ft. lb.	=	32.174	ft. poundals,	log =	1.50 750	1 ft. poundal	=	3.1081×10^{-2}	ft. lbs., log = $\bar{2}$.49 250
	=	0.13826	kg. meters,		$\bar{1}$.14 068	1 kg. meter	=	7.2330	" , 0.85 932
	=	1.3558	Joules,†		0.13 220	1 Joule †	=	0.73756	" , $\bar{1}$.86 780
	=	1.2861×10^{-3}	mean B. t. u.,		$\bar{3}$.10 929	1 mean B. t. u.	=	777.5+	" , 2.89 071
	=	0.3241	gr. calories,		$\bar{1}$.51 068	1 gr. calorie	=	3.086	" , 0.48 932
	=	7.145×10^{-4}	lb. °C. cals.,		$\bar{4}$.85 402	1 lb. °C. cal.	=	1.3996×10^{3}	" , 3.14 598
	=	1.3381×10^{-2}	liter atmos,		$\bar{2}$.12 647	1 liter atmo	=	74.735	" , 1.87 353
	=	4.7253×10^{-4}	cu. ft. atmos,		$\bar{4}$.67 443	1 cu. ft. atmo	=	2.1163×10^{3}	" , 3.32 557
	=	5.0505×10^{-7}	H. P. hours,		$\bar{7}$.70 333	1 H. P. hour	=	$1.98^{*} \times 10^{6}$	" , 6.29 667
	=	5.1206×10^{-7}	chev. vap. hrs.,		$\bar{7}$.70 932	1 chev. vap. hr.	=	1.9529×10^{6}	" , 6.29 068
	=	3.7662×10^{-4}	watt hours		$\bar{4}$.57 590	1 watt hour	=	2.6552×10^{3}	" , 3.42 410
1 Joule†	=	0.10197	kg. meters,	log =	$\bar{1}$.00 848	1 kg. meter	=	9.80665^{*}	Joules,† log = 0.99 152
	=	0.73756	ft. lbs.,		$\bar{1}$.86 780	1 ft. lb.	=	1.3558	" , 0.13 220
	=	23.730	ft. poundals,		1.37 530	1 ft. poundal	=	4.2140×10^{-2}	" , $\bar{2}$.62 470
	=	9.486×10^{-4}	mean B. t. u.,		$\bar{4}$.97 709	1 mean B. t. u.	=	1.0542×10^{3}	" , 3.02 291
	=	0.2390	gr. calories,		$\bar{1}$.37 848	1 gr. calorie	=	4.1834	" , 0.62 153
	=	5.270×10^{-4}	lb. °C. cal.,		$\bar{4}$.72 181	1 lb. °C. cal.	=	1.8976×10^{3}	" , 3.27 818
	=	9.8690×10^{-3}	liter atmos,		$\bar{3}$.99 427	1 liter atmo	=	1.0133×10^{2}	" , 2.00 573
	=	3.4852×10^{-4}	cu. ft. atmos,		$\bar{4}$.54 223	1 cu. ft. atmo	=	2.8693×10^{3}	" , 3.45 777
	=	3.7251×10^{-7}	H. P. hours,		$\bar{7}$.57 113	1 H. P. hour	=	2.6845×10^{6}	" , 6.42 887
	=	3.7767×10^{-7}	chev. vap. hrs.,		$\bar{7}$.57 711	1 chev. vap. hr.	=	2.6478×10^{6}	" , 6.42 288
	=	2.7778×10^{-4}	watt hours,		$\bar{4}$.44 370	1 watt hour	=	$3.6^{*} \times 10^{3}$	" , 3.55 630
1 B. t. u.	=	2.5200×10^{2}	gr. calories,	log =	2.40 139	1 gr. calorie	=	3.9683×10^{-3}	B. t. u., log = $\bar{3}$.59 861
	=	0.5556	lb. °C. cal.,		$\bar{1}$.74 473	1 lb. °C. cal.	=	1.8^{*}	" , 0.25 527
	=	777.5+	ft. lbs.,		2.89 071	1 ft. lb.	=	1.2861×10^{-3}	" , $\bar{3}$.10 929
	=	2.5016×10^{4}	ft. poundals,		4.39 822	1 ft. poundal	=	3.997×10^{-5}	" , $\bar{5}$.60 178
	=	1.0750×10^{2}	kg. meters,		2.03 139	1 kg. meter	=	9.302×10^{-3}	" , $\bar{3}$.96 861
	=	1.0542×10^{3}	Joules,†		3.02 291	1 Joule†	=	9.486×10^{-4}	" , $\bar{4}$.97 709
	=	10.404	liter atmos,		1.01 719	1 liter atmo	=	9.612×10^{-2}	" , $\bar{2}$.98 281
	=	0.3674	cu. ft. atmos,		$\bar{1}$.56 514	1 cu. ft. atmo	=	2.722	" , 0.43 486
	=	3.927×10^{-4}	H. P. hours,		$\bar{4}$.59 405	1 H. P. hour	=	2.547×10^{3}	" , 3.40 595
	=	3.981×10^{-4}	chev. vap. hrs.,		$\bar{4}$.60 003	1 chev. vap. hr.	=	2.512×10^{3}	" , 3.39 996
	=	0.2928	watt hours.		$\bar{1}$.46 661	1 watt hour	=	3.415	" , 0.53 339
1 gr. cal.	=	3.9683×10^{-3}	mean B.t.u.,	log =	$\bar{3}$.59 861	1 mean B. t. u.	=	2.5200×10^{2}	gr. cal., log = 2.40 139
	=	2.2046×10^{-3}	lb. °C. cal.,		$\bar{3}$.34 333	1 lb. °C. cal.	=	4.5359×10^{2}	" , 2.65 667
	=	3.086	ft. lbs.,		0.48 932	1 ft. lb.	=	0.3241	" , $\bar{1}$.51 068
	=	99.27	ft. poundals,		1.99 682	1 ft. poundal	=	1.0073×10^{-2}	" , $\bar{2}$.00 318
	=	0.4266	kg. meters,		$\bar{1}$.63 000	1 kg. meter	=	2.344	" , 0.37 000
	=	4.1834	Joules,†		0.62 153	1 Joule†	=	0.2390	" , $\bar{1}$.37 848
	=	4.1286×10^{-2}	liter atmos,		$\bar{2}$.61 579	1 liter atmo	=	24.22	" , 1.38 421
	=	1.4580×10^{-3}	cu. ft. atmos,		$\bar{3}$.16 374	1 cu. ft. atmo	=	6.859×10^{2}	" , 2.83 626
	=	1.5583×10^{-6}	H. P. hours,		$\bar{6}$.19 265	1 H. P. hour	=	6.417×10^{5}	" , 5.80 735
	=	1.5800×10^{-6}	chev. vap. hrs.,		$\bar{6}$.19 864	1 chev. vap. hr.	=	6.329×10^{5}	" , 5.80 135
	=	1.1621×10^{-3}	watt hours,		$\bar{3}$.06 522	1 watt hour	=	8.605×10^{2}	" , 2.93 478

Power

1 horse power (H. P.) is 550 ft. lbs. per second. 1 watt is 1 Joule per second or 10^{7} ergs per second. 1 kilowatt (K. W.) is 1000 watts. 1 cheval-vapeur, or pferdekraft, or "continental horse power," is 75 kg. meters per second. 1 poncelet is 100 kg. meters per second.

1 K. W.	=	1.3410	H. P.,	log =	0.12 743	1 H. P.	=	0.7457	K. W., log = $\bar{1}$.87 257
	=	1.3597	chev. vap.,		0.13 343		=	1.0139	chev. vap., 0.00 599
	=	1.0197	poncelets,		0.00 849		=	0.7604	poncelets, $\bar{1}$.88 105
	=	737.56	ft. lbs./sec.,		2.86 780		=	550.*	ft. lbs./sec., 2.74 036
	=	101.97	kg. m./sec.,		2.00 848		=	76.040	kg. m./sec., 1.88 104
	=	.9486	B. t. u./sec.,		$\bar{1}$.97 709		=	0.7074	B. t. u./sec., $\bar{1}$.84 965
	=	239.04	gr. cals./sec.,		2.37 848		=	178.25	gr. cal./sec., 2.25 104

* Exact value, by definition.

† 1 Joule = 10^{7} ergs.

Logarithms to the Base 10

	0	1	2	3	4	5	6	7	8	9	10
1.00	0.0000	0004	0009	0013	0017	0022	0026	0030	0035	0039	0043
1.01	0043	0048	0052	0056	0060	0065	0069	0073	0077	0082	0086
1.02	0086	0090	0095	0099	0103	0107	0111	0116	0120	0124	0128
1.03	0128	0133	0137	0141	0145	0149	0154	0158	0162	0166	0170
1.04	0170	0175	0179	0183	0187	0191	0195	0199	0204	0208	0212
1.05	0212	0216	0220	0224	0228	0233	0237	0241	0245	0249	0253
1.06	0253	0257	0261	0265	0269	0273	0278	0282	0286	0290	0294
1.07	0294	0298	0302	0306	0310	0314	0318	0322	0326	0330	0334
1.08	0334	0338	0342	0346	0350	0354	0358	0362	0366	0370	0374
1.09	0374	0378	0382	0386	0390	0394	0398	0402	0406	0410	0414
1.10	0.0414	0418	0422	0426	0430	0434	0438	0441	0445	0449	0453
1.11	0453	0457	0461	0465	0469	0473	0477	0481	0484	0488	0492
1.12	0492	0496	0500	0504	0508	0512	0515	0519	0523	0527	0531
1.13	0531	0535	0538	0542	0546	0550	0554	0558	0561	0565	0569
1.14	0569	0573	0577	0580	0584	0588	0592	0596	0599	0603	0607
1.15	0607	0611	0615	0618	0622	0626	0630	0633	0637	0641	0645
1.16	0645	0648	0652	0656	0660	0663	0667	0671	0674	0678	0682
1.17	0682	0686	0689	0693	0697	0700	0704	0708	0711	0715	0719
1.18	0719	0722	0726	0730	0734	0737	0741	0745	0748	0752	0755
1.19	0755	0759	0763	0766	0770	0774	0777	0781	0785	0788	0792
1.20	0.0792	0795	0799	0803	0806	0810	0813	0817	0821	0824	0828
1.21	0828	0831	0835	0839	0842	0846	0849	0853	0856	0860	0864
1.22	0864	0867	0871	0874	0878	0881	0885	0888	0892	0896	0899
1.23	0899	0903	0906	0910	0913	0917	0920	0924	0927	0931	0934
1.24	0934	0938	0941	0945	0948	0952	0955	0959	0962	0966	0969
1.25	0969	0973	0976	0980	0983	0986	0990	0993	0997	1000	1004
1.26	1004	1007	1011	1014	1017	1021	1024	1028	1031	1035	1038
1.27	1038	1041	1045	1048	1052	1055	1059	1062	1065	1069	1072
1.28	1072	1075	1079	1082	1086	1089	1092	1096	1099	1103	1106
1.29	1106	1109	1113	1116	1119	1123	1126	1129	1133	1136	1139
1.30	0.1139	1143	1146	1149	1153	1156	1159	1163	1166	1169	1173
1.31	1173	1176	1179	1183	1186	1189	1193	1196	1199	1202	1206
1.32	1206	1209	1212	1216	1219	1222	1225	1229	1232	1235	1239
1.33	1239	1242	1245	1248	1252	1255	1258	1261	1265	1268	1271
1.34	1271	1274	1278	1281	1284	1287	1290	1294	1297	1300	1303
1.35	1303	1307	1310	1313	1316	1319	1323	1326	1329	1332	1335
1.36	1335	1339	1342	1345	1348	1351	1355	1358	1361	1364	1367
1.37	1367	1370	1374	1377	1380	1383	1386	1389	1392	1396	1399
1.38	1399	1402	1405	1408	1411	1414	1418	1421	1424	1427	1430
1.39	1430	1433	1436	1440	1443	1446	1449	1452	1455	1458	1461
1.40	0.1461	1464	1467	1471	1474	1477	1480	1483	1486	1489	1492
1.41	1492	1495	1498	1501	1504	1508	1511	1514	1517	1520	1523
1.42	1523	1526	1529	1532	1535	1538	1541	1544	1547	1550	1553
1.43	1553	1556	1559	1562	1565	1569	1572	1575	1578	1581	1584
1.44	1584	1587	1590	1593	1596	1599	1602	1605	1608	1611	1614
1.45	1614	1617	1620	1623	1626	1629	1632	1635	1638	1641	1644
1.46	1644	1647	1649	1652	1655	1658	1661	1664	1667	1670	1673
1.47	1673	1676	1679	1682	1685	1688	1691	1694	1697	1700	1703
1.48	1703	1706	1708	1711	1714	1717	1720	1723	1726	1729	1732
1.49	1732	1735	1738	1741	1744	1746	1749	1752	1755	1758	1761

	0	1	2	3	4	5	6	7	8	9	10
1.50	0.1761	1764	1767	1770	1772	1775	1778	1781	1784	1787	1790
1.51	1790	1793	1796	1798	1801	1804	1807	1810	1813	1816	1818
1.52	1818	1821	1824	1827	1830	1833	1836	1838	1841	1844	1847
1.53	1847	1850	1853	1855	1858	1861	1864	1867	1870	1872	1875
1.54	1875	1878	1881	1884	1886	1889	1892	1895	1898	1901	1903
1.55	1903	1906	1909	1912	1915	1917	1920	1923	1926	1928	1931
1.56	1931	1934	1937	1940	1942	1945	1948	1951	1953	1956	1959
1.57	1959	1962	1965	1967	1970	1973	1976	1978	1981	1984	1987
1.58	1987	1989	1992	1995	1998	2000	2003	2006	2009	2011	2014
1.59	2014	2017	2019	2022	2025	2028	2030	2033	2036	2038	2041
1.60	0.2041	2044	2047	2049	2052	2055	2057	2060	2063	2066	2068
1.61	2068	2071	2074	2076	2079	2082	2084	2087	2090	2092	2095
1.62	2095	2098	2101	2103	2106	2109	2111	2114	2117	2119	2122
1.63	2122	2125	2127	2130	2133	2135	2138	2140	2143	2146	2148
1.64	2148	2151	2154	2156	2159	2162	2164	2167	2170	2172	2175
1.65	2175	2177	2180	2183	2185	2188	2191	2193	2196	2198	2201
1.66	2201	2204	2206	2209	2212	2214	2217	2219	2222	2225	2227
1.67	2227	2230	2232	2235	2238	2240	2243	2245	2248	2251	2253
1.68	2253	2256	2258	2261	2263	2266	2269	2271	2274	2276	2279
1.69	2279	2281	2284	2287	2289	2292	2294	2297	2299	2302	2304
1.70	0.2304	2307	2310	2312	2315	2317	2320	2322	2325	2327	2330
1.71	2330	2333	2335	2338	2340	2343	2345	2348	2350	2353	2355
1.72	2355	2358	2360	2363	2365	2368	2370	2373	2375	2378	2380
1.73	2380	2383	2385	2388	2390	2393	2395	2398	2400	2403	2405
1.74	2405	2408	2410	2413	2415	2418	2420	2423	2425	2428	2430
1.75	2430	2433	2435	2438	2440	2443	2445	2448	2450	2453	2455
1.76	2455	2458	2460	2463	2465	2467	2470	2472	2475	2477	2480
1.77	2480	2482	2485	2487	2490	2492	2494	2497	2499	2502	2504
1.78	2504	2507	2509	2512	2514	2516	2519	2521	2524	2526	2529
1.79	2529	2531	2533	2536	2538	2541	2543	2545	2548	2550	2553
1.80	0.2553	2555	2558	2560	2562	2565	2567	2570	2572	2574	2577
1.81	2577	2579	2582	2584	2586	2589	2591	2594	2596	2598	2601
1.82	2601	2603	2605	2608	2610	2613	2615	2617	2620	2622	2625
1.83	2625	2627	2629	2632	2634	2636	2639	2641	2643	2646	2648
1.84	2648	2651	2653	2655	2658	2660	2662	2665	2667	2669	2672
1.85	2672	2674	2676	2679	2681	2683	2686	2688	2690	2693	2695
1.86	2695	2697	2700	2702	2704	2707	2709	2711	2714	2716	2718
1.87	2718	2721	2723	2725	2728	2730	2732	2735	2737	2739	2742
1.88	2742	2744	2746	2749	2751	2753	2755	2758	2760	2762	2765
1.89	2765	2767	2769	2772	2774	2776	2778	2781	2783	2785	2788
1.90	0.2788	2790	2792	2794	2797	2799	2801	2804	2806	2808	2810
1.91	2810	2813	2815	2817	2819	2822	2824	2826	2828	2831	2833
1.92	2833	2835	2838	2840	2842	2844	2847	2849	2851	2853	2856
1.93	2856	2858	2860	2862	2865	2867	2869	2871	2874	2876	2878
1.94	2878	2880	2882	2885	2887	2889	2891	2894	2896	2898	2900
1.95	2900	2903	2905	2907	2909	2911	2914	2916	2918	2920	2923
1.96	2923	2925	2927	2929	2931	2934	2936	2938	2940	2942	2945
1.97	2945	2947	2949	2951	2953	2956	2958	2960	2962	2964	2967
1.98	2967	2969	2971	2973	2975	2978	2980	2982	2984	2986	2989
1.99	2989	2991	2993	2995	2997	2999	3002	3004	3006	3008	3010

Logarithms to the Base 10

These two pages give the common logarithms of numbers between 1 and 10, correct to four places. Moving the decimal point n places to the right (or left) in the number is equivalent to adding n (or $-n$) to the logarithm. Thus, $\log 0.017453 = 0.2419 - 2 \; [= \bar{2}.2419]$.

To facilitate interpolation, the tenths of the tabular differences are given at the end of each line, so that the differences themselves need not be considered. In using these aids, first find the nearest tabular entry, and then add (to move to the right) or subtract (to move to the left), as the case may require.

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	0	1	2	3	4	5	6	7	8	9	10	Tenths of the Tabular Difference 1 2 3 4 5
1.0	0.0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	0414	
1.1	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	0792	
1.2	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	1139	
1.3	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	1461	To avoid interpolation in the first ten lines, use the special table on the preceding page.
1.4	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	1761	
1.5	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	2041	
1.6	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	2304	
1.7	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2553	
1.8	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2788	
1.9	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	3010	
2.0	0.3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	3222	2 4 6 8 11
2.1	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	3424	2 4 6 8 10
2.2	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	3617	2 4 6 8 10
2.3	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	3802	2 4 5 7 9
2.4	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	3979	2 4 5 7 9
2.5	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	4150	2 3 5 7 9
2.6	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	4314	2 3 5 7 8
2.7	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	4472	2 3 5 6 8
2.8	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	4624	2 3 5 6 8
2.9	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	4771	1 3 4 6 7
3.0	0.4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	4914	1 3 4 6 7
3.1	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	5051	1 3 4 6 7
3.2	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	5185	1 3 4 5 7
3.3	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	5315	1 3 4 5 6
3.4	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	5441	1 3 4 5 6
3.5	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	5563	1 2 4 5 6
3.6	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	5682	1 2 4 5 6
3.7	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	5798	1 2 3 5 6
3.8	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	5911	1 2 3 5 6
3.9	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	6021	1 2 3 4 6
4.0	0.6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	6128	1 2 3 4 5
4.1	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	6232	1 2 3 4 5
4.2	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	6335	1 2 3 4 5
4.3	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	6435	1 2 3 4 5
4.4	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	6532	1 2 3 4 5
4.5	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	6628	1 2 3 4 5
4.6	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	6721	1 2 3 4 5
4.7	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	6812	1 2 3 4 5
4.8	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	6902	1 2 3 4 4
4.9	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	6990	1 2 3 4 4

Logarithms to the Base 10

	0	1	2	3	4	5	6	7	8	9	10	Tenths of the Tabular Difference 1	2	3	4	5
5.0	0.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	7076	1	2	3	3	4
5.1	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	7160	1	2	3	3	4
5.2	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	7243	1	2	2	3	4
5.3	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	7324	1	2	2	3	4
5.4	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	7404	1	2	2	3	4
5.5	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	7482	1	2	2	3	4
5.6	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	7559	1	2	2	3	4
5.7	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	7634	1	2	2	3	4
5.8	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	7709	1	1	2	3	4
5.9	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	7782	1	1	2	3	4
6.0	0.7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	7853	1	1	2	3	4
6.1	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	7924	1	1	2	3	4
6.2	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	7993	1	1	2	3	3
6.3	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	8062	1	1	2	3	3
6.4	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	8129	1	1	2	3	3
6.5	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	8195	1	1	2	3	3
6.6	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	8261	1	1	2	3	3
6.7	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	8325	1	1	2	3	3
6.8	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	8388	1	1	2	3	3
6.9	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	8451	1	1	2	3	3
7.0	0.8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	8513	1	1	2	2	3
7.1	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	8573	1	1	2	2	3
7.2	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	8633	1	1	2	2	3
7.3	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	8692	1	1	2	2	3
7.4	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	8751	1	1	2	2	3
7.5	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	8808	1	1	2	2	3
7.6	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	8865	1	1	2	2	3
7.7	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	8921	1	1	2	2	3
7.8	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	8976	1	1	2	2	3
7.9	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	9031	1	1	2	2	3
8.0	0.9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	9085	1	1	2	2	3
8.1	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	9138	1	1	2	2	3
8.2	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	9191	1	1	2	2	3
8.3	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	9243	1	1	2	2	3
8.4	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	9294	1	1	2	2	3
8.5	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	9345	1	1	2	2	3
8.6	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	9395	1	1	2	2	3
8.7	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	9445	0	1	1	2	2
8.8	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	9494	0	1	1	2	2
8.9	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	9542	0	1	1	2	2
9.0	0.9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	9590	0	1	1	2	2
9.1	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	9638	0	1	1	2	2
9.2	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	9685	0	1	1	2	2
9.3	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	9731	0	1	1	2	2
9.4	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	9777	0	1	1	2	2
9.5	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	9823	0	1	1	2	2
9.6	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	9868	0	1	1	2	2
9.7	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	9912	0	1	1	2	2
9.8	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	9956	0	1	1	2	2
9.9	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996		0	1	1	2	2

Logarithms to the Base e

These two pages give the natural (hyperbolic, or Napierian) logarithms of numbers between 1 and 10, correct to four places. Moving the decimal point n places to the right (or left) in the number is equivalent to adding n times 2.3026 (or n times $\bar{3}.6974$) to the logarithm.

1	2.3026	1	0.6974 − 3
2	4.6052	2	0.3948 − 5
3	6.9078	3	0.0922 − 7
4	9.2103	4	0.7897 − 10
5	11.5129	5	0.4871 − 12
6	13.8155	6	0.1845 − 14
7	16.1181	7	0.8819 − 17
8	18.4207	8	0.5793 − 19
9	20.7233	9	0.2767 − 21

	0	1	2	3	4	5	6	7	8	9	10	Tenths of the Tabular Difference 1	2	3	4	5
1.0	0.0000	0100	0198	0296	0392	0488	0583	0677	0770	0862	0.0953	10	19	29	38	48
1.1	0953	1044	1133	1222	1310	1398	1484	1570	1655	1740	1823	9	17	26	35	44
1.2	1823	1906	1989	2070	2151	2231	2311	2390	2469	2546	2624	8	16	24	32	40
1.3	2624	2700	2776	2852	2927	3001	3075	3148	3221	3293	3365	7	15	22	30	37
1.4	3365	3436	3507	3577	3646	3716	3784	3853	3920	3988	4055	7	14	21	28	34
1.5	4055	4121	4187	4253	4318	4383	4447	4511	4574	4637	4700	6	13	19	26	32
1.6	4700	4762	4824	4886	4947	5008	5068	5128	5188	5247	5306	6	12	18	24	30
1.7	5306	5365	5423	5481	5539	5596	5653	5710	5766	5822	5878	6	11	17	23	29
1.8	5878	5933	5988	6043	6098	6152	6206	6259	6313	6366	6419	5	11	16	22	27
1.9	6419	6471	6523	6575	6627	6678	6729	6780	6831	6881	0.6931	5	10	15	21	26
2.0	0.6931	6981	7031	7080	7129	7178	7227	7275	7324	7372	7419	5	10	15	20	24
2.1	7419	7467	7514	7561	7608	7655	7701	7747	7793	7839	7885	5	9	14	19	23
2.2	7885	7930	7975	8020	8065	8109	8154	8198	8242	8286	8329	4	9	13	18	22
2.3	8329	8372	8416	8459	8502	8544	8587	8629	8671	8713	8755	4	9	13	17	21
2.4	8755	8796	8838	8879	8920	8961	9002	9042	9083	9123	9163	4	8	12	16	20
2.5	9163	9203	9243	9282	9322	9361	9400	9439	9478	9517	9555	4	8	12	16	20
2.6	9555	9594	9632	9670	9708	9746	9783	9821	9858	9895	0.9933	4	8	11	15	19
2.7	0.9933	9969	0006	0043	0080	0116	0152	0188	0225	0260	1.0296	4	7	11	15	18
2.8	1.0296	0332	0367	0403	0438	0473	0508	0543	0578	0613	0647	4	7	11	14	18
2.9	0647	0682	0716	0750	0784	0818	0852	0886	0919	0953	1.0986	3	7	10	14	17
3.0	1.0986	1019	1053	1086	1119	1151	1184	1217	1249	1282	1314	3	7	10	13	16
3.1	1314	1346	1378	1410	1442	1474	1506	1537	1569	1600	1632	3	6	10	13	16
3.2	1632	1663	1694	1725	1756	1787	1817	1848	1878	1909	1939	3	6	9	12	15
3.3	1939	1969	2000	2030	2060	2090	2119	2149	2179	2208	2238	3	6	9	12	15
3.4	2238	2267	2296	2326	2355	2384	2413	2442	2470	2499	2528	3	6	9	12	14
3.5	2528	2556	2585	2613	2641	2669	2698	2726	2754	2782	2809	3	6	8	11	14
3.6	2809	2837	2865	2892	2920	2947	2975	3002	3029	3056	3083	3	5	8	11	14
3.7	3083	3110	3137	3164	3191	3218	3244	3271	3297	3324	3350	3	5	8	11	13
3.8	3350	3376	3403	3429	3455	3481	3507	3533	3558	3584	3610	3	5	8	10	13
3.9	3610	3635	3661	3686	3712	3737	3762	3788	3813	3838	1.3863	3	5	8	10	13
4.0	1.3863	3888	3913	3938	3962	3987	4012	4036	4061	4085	4110	2	5	7	10	12
4.1	4110	4134	4159	4183	4207	4231	4255	4279	4303	4327	4351	2	5	7	10	12
4.2	4351	4375	4398	4422	4446	4469	4493	4516	4540	4563	4586	2	5	7	9	12
4.3	4586	4609	4633	4656	4679	4702	4725	4748	4770	4793	4816	2	5	7	9	11
4.4	4816	4839	4861	4884	4907	4929	4951	4974	4996	5019	5041	2	4	7	9	11
4.5	5041	5063	5085	5107	5129	5151	5173	5195	5217	5239	5261	2	4	7	9	11
4.6	5261	5282	5304	5326	5347	5369	5390	5412	5433	5454	5476	2	4	6	9	11
4.7	5476	5497	5518	5539	5560	5581	5602	5623	5644	5665	5686	2	4	6	8	11
4.8	5686	5707	5728	5748	5769	5790	5810	5831	5851	5872	5892	2	4	6	8	10
4.9	5892	5913	5933	5953	5974	5994	6014	6034	6054	6074	1.6094	2	4	6	8	10

Logarithms to the Base e

	0	1	2	3	4	5	6	7	8	9	10	Tenths of the Tabular Difference 1	2	3	4	5
5.0	1.6094	6114	6134	6154	6174	6194	6214	6233	6253	6273	6292	2	4	6	8	10
5.1	6292	6312	6332	6351	6371	6390	6409	6429	6448	6467	6487	2	4	6	8	10
5.2	6487	6506	6525	6544	6563	6582	6601	6620	6639	6658	6677	2	4	6	8	10
5.3	6677	6696	6715	6734	6752	6771	6790	6808	6827	6845	6864	2	4	6	7	9
5.4	6864	6882	6901	6919	6938	6956	6974	6993	7011	7029	7047	2	4	6	7	9
5.5	7047	7066	7084	7102	7120	7138	7156	7174	7192	7210	7228	2	4	5	7	9
5.6	7228	7246	7263	7281	7299	7317	7334	7352	7370	7387	7405	2	4	5	7	9
5.7	7405	7422	7440	7457	7475	7492	7509	7527	7544	7561	7579	2	3	5	7	9
5.8	7579	7596	7613	7630	7647	7664	7681	7699	7716	7733	7750	2	3	5	7	9
5.9	7750	7766	7783	7800	7817	7834	7851	7867	7884	7901	1.7918	2	3	5	7	8
6.0	1.7918	7934	7951	7967	7984	8001	8017	8034	8050	8066	8083	2	3	5	7	8
6.1	8083	8099	8116	8132	8148	8165	8181	8197	8213	8229	8245	2	3	5	7	8
6.2	8245	8262	8278	8294	8310	8326	8342	8358	8374	8390	8405	2	3	5	6	8
6.3	8405	8421	8437	8453	8469	8485	8500	8516	8532	8547	8563	2	3	5	6	8
6.4	8563	8579	8594	8610	8625	8641	8656	8672	8687	8703	8718	2	3	5	6	8
6.5	8718	8733	8749	8764	8779	8795	8810	8825	8840	8856	8871	2	3	5	6	8
6.6	8871	8886	8901	8916	8931	8946	8961	8976	8991	9006	9021	2	3	5	6	8
6.7	9021	9036	9051	9066	9081	9095	9110	9125	9140	9155	9169	1	3	4	6	7
6.8	9169	9184	9199	9213	9228	9242	9257	9272	9286	9301	9315	1	3	4	6	7
6.9	9315	9330	9344	9359	9373	9387	9402	9416	9430	9445	1.9459	1	3	4	6	7
7.0	1.9459	9473	9488	9502	9516	9530	9544	9559	9573	9587	9601	1	3	4	6	7
7.1	9601	9615	9629	9643	9657	9671	9685	9699	9713	9727	9741	1	3	4	6	7
7.2	9741	9755	9769	9782	9796	9810	9824	9838	9851	9865	1.9879	1	3	4	6	7
7.3	1.9879	9892	9906	9920	9933	9947	9961	9974	9988	0001	2.0015	1	3	4	5	7
7.4	2.0015	0028	0042	0055	0069	0082	0096	0109	0122	0136	0149	1	3	4	5	7
7.5	0149	0162	0176	0189	0202	0215	0229	0242	0255	0268	0281	1	3	4	5	7
7.6	0281	0295	0308	0321	0334	0347	0360	0373	0386	0399	0412	1	3	4	5	7
7.7	0412	0425	0438	0451	0464	0477	0490	0503	0516	0528	0541	1	3	4	5	6
7.8	0541	0554	0567	0580	0592	0605	0618	0631	0643	0656	0669	1	3	4	5	6
7.9	0669	0681	0694	0707	0719	0732	0744	0757	0769	0782	2.0794	1	3	4	5	6
8.0	2.0794	0807	0819	0832	0844	0857	0869	0882	0894	0906	0919	1	2	4	5	6
8.1	0919	0931	0943	0956	0968	0980	0992	1005	1017	1029	1041	1	2	4	5	6
8.2	1041	1054	1066	1078	1090	1102	1114	1126	1138	1150	1163	1	2	4	5	6
8.3	1163	1175	1187	1199	1211	1223	1235	1247	1258	1270	1282	1	2	4	5	6
8.4	1282	1294	1306	1318	1330	1342	1353	1365	1377	1389	1401	1	2	4	5	6
8.5	1401	1412	1424	1436	1448	1459	1471	1483	1494	1506	1518	1	2	4	5	6
8.6	1518	1529	1541	1552	1564	1576	1587	1599	1610	1622	1633	1	2	3	5	6
8.7	1633	1645	1656	1668	1679	1691	1702	1713	1725	1736	1748	1	2	3	5	6
8.8	1748	1759	1770	1782	1793	1804	1815	1827	1838	1849	1861	1	2	3	5	6
8.9	1861	1872	1883	1894	1905	1917	1928	1939	1950	1961	2.1972	1	2	3	4	6
9.0	2.1972	1983	1994	2006	2017	2028	2039	2050	2061	2072	2083	1	2	3	4	6
9.1	2083	2094	2105	2116	2127	2138	2148	2159	2170	2181	2192	1	2	3	4	5
9.2	2192	2203	2214	2225	2235	2246	2257	2268	2279	2289	2300	1	2	3	4	5
9.3	2300	2311	2322	2332	2343	2354	2364	2375	2386	2396	2407	1	2	3	4	5
9.4	2407	2418	2428	2439	2450	2460	2471	2481	2492	2502	2513	1	2	3	4	5
9.5	2513	2523	2534	2544	2555	2565	2576	2586	2597	2607	2618	1	2	3	4	5
9.6	2618	2628	2638	2649	2659	2670	2680	2690	2701	2711	2721	1	2	3	4	5
9.7	2721	2732	2742	2752	2762	2773	2783	2793	2803	2814	2824	1	2	3	4	5
9.8	2824	2834	2844	2854	2865	2875	2885	2895	2905	2915	2925	1	2	3	4	5
9.9	2925	2935	2946	2956	2966	2976	2986	2996	3006	3016	2.3026	1	2	3	4	5

PART II

THE USE OF THE DIAGRAMS

THE steam tables give values of the simultaneous physical coördinates (or properties) of steam, such as the pressure, specific volume, temperature, entropy, total heat, and internal energy. When certain of these physical coördinates are known, the remainder can be obtained from the tables, either directly, or by an interpolation. The values tabulated are for dry and saturated steam and for superheated steam; if the steam is wet, its properties must be calculated.

The simultaneous properties of steam can also be shown by the use of a steam diagram. The diagram may be drawn on a plane which has any independent pair of the properties as its coördinates; for example, the ordinates and abscissæ may be, respectively, pressures and specific volumes, or temperatures and entropies, or total heats and entropies, or total heats and pressures. Each point on such a plane represents steam in a perfectly definite condition: that is, with all its physical coördinates fixed. On such a plane it is possible to plot a steam diagram, or chart, consisting of a number of curves, each of which goes through all points on the plane having a certain constant value of some one physical coördinate. If a well-selected and sufficient number of such curves is drawn for each physical coördinate, then, for any point on the plane, all the properties of steam can be determined by reading the corresponding ordinate and abscissa, and by interpolation in the plotted families of curves. For example, on a pressure-volume plane on which families of constant entropy curves, and of constant total heat curves, are drawn, there can be read off by inspection the pressure, volume, entropy, and total heat, corresponding to any point on the plane.

The families of curves which are drawn may include curves of constant dryness factor (quality) of saturated steam; consequently the diagram may give by inspection the properties of wet steam. This is an advantage over the tables.

Of the various planes on which these diagrams may be drawn, some are more convenient than others. Any one of them will serve if the only purpose in view is to find single values of physical coördinates. For this purpose, the relative advantages of the various planes is a question only of the accuracy and ease with which the desired quantities can be read.

A diagram may, however, have uses other than merely showing the simultaneous properties of steam. It may be used for the solution of certain problems, if the proper plane is chosen and the necessary families of curves are drawn on it. It should be clearly borne in mind that the choice of a plane for this purpose has no relation to the choice of a plane on which to represent the cycle of operations of a steam

engine or other steam appliance. For the latter purpose two special planes are of particular value, (1) the pressure-volume plane, and (2) the temperature-entropy plane. The pressure-volume plane shows the amount of external work done while the steam is going through any series of changes; the temperature-entropy plane, in a similar way, shows the heat added to or abstracted from the steam. To find the work done or the heat exchange, it is only necessary that the steam cycle should be drawn on those planes; the presence of families of curves of the physical coördinates is of no use in finding those quantities. In other words, the plane alone is required for that purpose, not a steam diagram on that plane.

A steam diagram on the pressure-volume plane, or on the temperature-entropy plane, does not offer any particular advantages over other diagrams for finding steam quantities. For the solution of many problems of common occurrence such a diagram is decidedly less useful and convenient than a diagram in which the total heat of steam is one of the coördinates.

By the total heat of steam is meant the sum of its internal energy, E, and of the heat equivalent of the product of its pressure and specific volume, or

$$H = E + 144\ Apv.$$

(It should be noted that total heat defined in this way differs slightly from the total heat as found in Regnault's investigations of saturated steam and as usually given in steam tables; for a discussion of this, see page 101.)

The total heat of steam is a quantity which enters into a large number of problems. It represents the energy (other than kinetic energy) entering any piece of apparatus with every pound of steam that goes to it, and the energy (other than kinetic) leaving it with every pound of steam that leaves it. In most steam appliances, under steady conditions of operation, the weight of steam entering per unit of time is equal to the weight of steam leaving. In such an appliance if H_1 is the total heat of one pound of the entering steam, and H_2 is the total heat of one pound of the leaving steam, then $H_1 - H_2$ is the energy given up in the apparatus by each pound of steam. In a steam engine $H_1 - H_2$ is the sum of the work done and of the external heat-losses; in a boiler its value is negative and represents the heat supply per pound of steam formed; in a non-conducting steam nozzle it is the heat that is converted into kinetic energy; in a throttling calorimeter its value is zero because there is no external work done, no heat conduction, and no change in kinetic energy.

On a steam diagram on which the ordinates are total heats, the quantity $H_1 - H_2$ is represented by the vertical drop between the points representing the entering and leaving conditions. Vertical distances measure the energy given up in a steam appliance, with a constant scale all over the diagram. In flow of steam problems, this constancy of scale permits the immediate graphical determination of the velocity of flow by merely transferring the vertical distance $H_1 - H_2$ to a velocity scale at the side of the diagram. It is in this respect especially that a total heat-entropy diagram is greatly superior to a temperature-entropy diagram.

THE USE OF THE DIAGRAMS

Two diagrams are presented, both with total heats as ordinates. By the superposition of three families of curves it would have been possible to give all the data on one diagram; but that would have led to confusion if the curves had been as closely spaced as is requisite for accurate interpolation.

The diagrams give information as to the total heat, entropy, and specific volume of wet and of superheated steam, within a pressure range from .5 to 600 lbs. per sq. in., and for steam in any condition between a quality of about .7 and a superheat of about 600° F. If the properties of water or the latent heat of steam come into the problem, the tables must be used to supplement the readings from the diagrams.

The principal advantages of the diagrams over the tables are that they give the properties of wet steam, and that they permit an expeditious solution of many problems without calculation and with a degree of accuracy[1] which is sufficient for the ordinary purposes of the engineer.

The method of solution of some of the more commonly occurring problems is given below.

Properties of Steam

The two diagrams give the values of five of the physical coördinates of steam: pressure, quality,[2] entropy, total heat, and specific volume. If any two of these coördinates are known, the remaining three can be found by inspection. In some cases it will be more expeditious (and it will always be more accurate) to use the tables instead of the diagrams, but in other cases, as when wet steam is used, the diagrams will save time and calculation. Pressures, qualities, and total heats can be found on both diagrams; if entropy is involved, Diagram I must be used; if specific volume is involved, Diagram II must be used. The pressure scale on the top of Diagram II is more open than the pressure scale of Diagram I, and consequently somewhat greater accuracy is obtainable by using Diagram II in cases where either diagram can be used.

The method of finding a desired quantity is the same in all cases. The point of intersection of the lines (actual or interpolated) representing the two known quantities is located on the appropriate diagram; the position of this point with reference to the lines representing the desired quantity determines the actual value of that quantity.

Examples.

1. A vessel of 4 cu. ft. capacity contains 0.2 lbs. of water and 0.8 lbs. of steam. What is the pressure?

[1] The accuracy of a two-color diagram depends on the accuracy of registration of the two printings. The original drawings showed in no place an error of as much as $\frac{1}{50}$ inch. The photographic reproduction of these drawings has resulted in minor local distortions, which in the lower corners of Diagram II amount to $\frac{1}{30}$ inch. This is the maximum distortion, and it occurs in the least important part of the diagram.

[2] In what follows, the word *quality* means, the dryness factor if the steam is saturated, the number of degrees of superheat if the steam is superheated. Pressures, throughout, are absolute pressures.

The intersection of the steam quality line, .80, with the specific volume line, 4 cu. ft., on Diagram II, occurs at a steam pressure of 87 lbs. per sq. in. abs.

2. Measurements from an indicator card show that at a certain instant during expansion the volume of the steam is 1.6 cu. ft. and the pressure 40 lbs. per sq. in. abs. If the weight of steam in the cylinder is 0.20 lbs., what is the quality of the steam at that instant?

The specific volume of the steam is $\frac{1.6}{.20}=8$ cu. ft. From Diagram II, steam of that volume and of 40 lbs. pressure has a quality of .764.

3. What is the entropy of 1 lb. of steam at 100 lbs. pressure and a temperature of 450° F.?

From the table on Diagram I, the temperature of saturated steam at 100 lbs. pressure is seen to be 328° F.; the steam is consequently superheated $450-328=122°$ F. From Diagram I, steam at 100 lbs. pressure, superheated 122° F., has an entropy 1.678.

4. An indicator (pressure-volume) card is to be redrawn on the temperature-entropy plane. What are the temperature and entropy corresponding to the condition defined in example 2?

Steam at 40 lbs. pressure has a temperature of 267° F., or $267+460=727°$ abs.

The entropy is seen, by Diagram I, to be 1.373.

5. What is the heat supply per lb. of steam to a boiler with feed water at 100° F., generating steam at 160 lbs. pressure and of a quality .99?

The total heat of steam (Diagram II) at 160 lbs. pressure and quality .99 is 1186 B. t. u.; the feed water contains approximately $100-32=68$ B. t. u. The heat supply per lb. of steam is consequently $1186-68=1118$ B. t. u.

6. What is the volume of 5 lbs. of steam at 1 lb. pressure and a quality .80?

The specific volume (Diagram II) is 265 cu. ft.; the volume of 5 lbs. is consequently $5\times 266=1330$ cu. ft.

Internal Energy

The internal energy of steam of known pressure, p, and specific volume, v, is given by the equation

$$E=H-144\,Apv.$$

Example 7. A cylinder contains 1 lb. of steam at a pressure of 80 lbs. per sq. in. and occupying a volume of 7 cu. ft. What is the internal energy of the steam?

The total heat of the steam (Diagram II) is 1274 B. t. u. The internal energy is

$$1274-.1852\times 80\times 7=1170 \text{ B. t. u.}$$

Adiabatic Expansion

During adiabatic expansion, entropy is constant. Vertical lines on Diagram I are lines of constant entropy. A vertical line is consequently the locus of the points representing the condition of steam which is expanding adiabatically. Two of the three quantities, pressure, specific volume, and quality, will generally be known at some one point on the adiabatic curve; this suffices for finding the entropy. When the entropy and one other property of the steam are known, the condition of the steam is fixed.

To find the quality of steam which has expanded adiabatically to some *known pressure*, locate the intersection of the known entropy and pressure lines; its position with reference to the constant quality lines gives the desired quality.

Example 8. Steam at 120 lbs. pressure, superheated 100° F., expands adiabatically. Find its quality and the ratio of expansion when the pressure reaches 15 lbs. per sq. in.

The entropy of the steam (Diagram I) is 1.651; at 15 lbs. pressure, steam of the same entropy has a quality .928. The initial volume (Diagram II) was 4.33 cu. ft.; the final volume is 24.4 cu. ft. The ratio of expansion is

$$\frac{24.4}{4.33}=5.63.$$

To find the pressure of steam which has expanded adiabatically to a *known quality*, locate the intersection of the known entropy and quality lines. The desired pressure is given by the position of the intersection with reference to the constant pressure lines.

Example 9. Steam at a pressure of 150 lbs. per sq. in., superheated 60° F., expands adiabatically. At what pressure will the steam become dry and saturated?

The entropy (Diagram I) is 1.6105; the corresponding entropy line crosses the dry and saturated steam line at 90 lbs. pressure.

To find the pressure and quality of steam which has expanded adiabatically to a *known volume*, requires the use of both diagrams. The desired pressure and quality lie on the known constant entropy line of Diagram I, and on the known constant specific volume line of Diagram II. Find by inspection of the two diagrams the one pair of simultaneous values of pressure and quality which are common to both lines; or, assume various final pressures, find the corresponding final volumes, and interpolate.

Example 10. Steam of 140 lbs. pressure, superheated 120° F., expands adiabatically with a ratio of expansion of 6. What are the pressure and quality at the end of expansion?

The initial specific volume (Diagram II) is 3.85 cu. ft.; the final specific volume is $6\times 3.85=23.10$ cu. ft. The entropy (Diagram I) is 1.6503. With

this entropy, steam at 17 lbs. has a quality .934 corresponding to a volume of 21.8 cu. ft.; at 15 lbs. the quality is .927, and volume 24.4. The final pressure is evidently between 15 and 17 lbs. At 16 lbs. the quality is .931 and volume 23.0. By interpolation the desired pressure is 15.9 lbs. per sq. in., and the corresponding quality .930.

Work done during Adiabatic Expansion

The work done during adiabatic expansion cannot be taken directly from the diagrams. It is equal in amount but opposite in sign to the change of internal energy during expansion.

$$W_{12}=E_1-E_2=H_1-H_2-144\,A(p_1v_1-p_2v_2)$$

The simplest way of obtaining the work done from the diagrams is to find $H_1—H_2$ for adiabatic expansion, and to subtract from it the second term in the equation given.

Example 11. How much work is done on unit mass of steam at 15 lbs. pressure and quality .90 when it is compressed adiabatically to one-fourth its original volume?

By a process similar to that given in example 10, the pressure at the end of compression is found to be 72 lbs. per sq. in., and the corresponding quality .988. The volumes at the beginning and end of the compression are 23.62 and 5.905 cu. ft. respectively.

The work done by the steam is

$$\begin{aligned} &H_1-H_2-144\,A(p_1v_1-p_2v_2)\\ &=1054-1169-.1852(15\times 23.62-72\times 5.905)\\ &=-115-13\\ &=-128 \text{ B. t. u.} \end{aligned}$$

or the work done on the steam is 128 B. t. u.

Work done in the Rankine Ideal Cycle

In the Rankine cycle, steam is admitted at a constant pressure, expands adiabatically to the back pressure and is exhausted against a constant back pressure. The engine is supposed to have no clearance. It is an ideal steam-engine cycle, with no internal friction, no heat losses and no free or imperfectly resisted expansion. In such a cycle all the energy that is taken from the steam must be converted into work. The work done per lb. of steam is consequently H_1-H_2. As the only expansion that takes place is adiabatic, the steam that is leaving has the same entropy as the entering steam.

To find the work done by unit mass of steam, in a Rankine cycle admitting steam of known quality and pressure, and expanding to a known back pressure, locate the

point representing the quality and pressure of the admission steam, and measure the vertical distance from this point to the known back pressure line. This distance represents the work done in B. t. u.

Example 12. Steam initially at 150 lbs. pressure, superheated 150° F., goes through a Rankine cycle with a back pressure of 2 lbs. per sq. in. How much work is done by unit mass of steam?

The total heat of steam at 150 lbs. pressure, superheated 150° F. (Diagram I), is 1275 B. t. u. Steam of the same entropy at 2 lbs. abs. pressure has a total heat of 964 B. t. u. The work of the Rankine cycle is

$$1275-964=311 \text{ B. t. u.}$$

The Flow of Steam

In a steam engine the resistance to expansion is offered by the piston, and the useful work is done on the piston; in a steam nozzle the resistance to expansion is offered by the steam which is ahead, and consequently the work is done on the steam, and results in giving it kinetic energy.

If steam is admitted to a properly designed, non-conducting nozzle without internal friction, it will expand adiabatically. Since there is no heat loss, and no external work done, all the energy that is taken from the steam must be converted into kinetic energy. The kinetic energy of the escaping steam is consequently H_1-H_2. The velocity corresponding to this kinetic energy of unit mass of steam can be read directly from the scale to the left of Diagram I. It is evident that the kinetic energy of the escaping steam is equal to the work that would have been done by the steam in a Rankine cycle with the same back pressure.

To find the velocity with which steam escapes from a properly designed frictionless nozzle, measure with a pair of compasses the change in the total heat of the steam during adiabatic expansion and transfer this measurement to the velocity scale.

Example 13. Steam at 100 lbs. pressure, superheated 60° F., expands in a nozzle to a pressure of 2 lbs. per sq. in. What is its final velocity?

The change in the total heat is 1219−954=266 B. t. u. This is seen by the scale on Diagram I to correspond to a velocity of 3650 ft. per second.

Example 14. A four-stage impulse turbine supplied with steam as in example 13 and with expansion to the same pressure, is designed for equal velocity of steam in each of the stages. What is that velocity?

The kinetic energy of the steam in each stage is $\frac{266}{4}=66.5$ B. t. u. This corresponds to a velocity of 1825 ft. per second.

Designing a Nozzle

The design of a steam nozzle for a desired weight flow is determined by the throat (smallest cross section) of the nozzle. The pressure at the throat will be about .58 of the initial pressure whenever the ratio of the final pressure to the initial pressure is less than that quantity; for ratios greater than .58 the throat pressure is the same as the final pressure. To determine the throat area, find the velocity of the steam at the throat from Diagram I and its specific volume from Diagram II. The specific volume multiplied by the desired weight flow in lbs. per second is the volume flowing per second past the throat. This volume divided by the velocity at the throat is equal to the area of the throat, in square feet.

Example 15. 50 lbs. of steam at 160 lbs. pressure, superheated 100° F., flow per minute through a nozzle into the atmosphere (15 lbs. per sq. in.). What is the smallest cross section of the nozzle?

The entropy of the steam is 1.629 and its total heat 1251 B. t. u. At the throat the pressure is approximately $160\times.58=92.8$ lbs. per sq. in.; the total heat is 1202 B. t. u., and the specific volume is 4.98. The kinetic energy at the throat is $1251-1202=49$ B. t. u., which corresponds to a velocity of 1575 ft. per second. The volume flowing per second past the throat is $\frac{50}{60}\times 4.98=4.15$ cu. ft. The throat area is consequently $\frac{4.15}{1575}\times 144=.380$ sq. ins.

Throttling

If steam expands through a small orifice (or a porous plug) without the addition or abstraction of heat, and is brought finally to its initial velocity, its total heat will be unchanged. This must be the case because none of the heat is converted into external work or kinetic energy and no heat is added or abstracted, so that $H_1-H_2=0$. The process is called throttling, and occurs when steam goes through a reducing valve and also in the throttling calorimeter. Horizontal lines on Diagrams I and II are lines of constant total heat and consequently show the changes in the condition of steam which result from throttling.

Example 16. Steam at 200 lbs. pressure, quality .99, passes through a reducing valve. At what pressure must the valve be set in order to discharge dry and saturated steam?

Inspection of Diagram I or II shows that dry and saturated steam at 119 lbs. has the same total heat as steam at 200 lbs. and quality .99.

Example 17. Steam in a throttling calorimeter has a pressure of 17 lbs. per sq. in. and a temperature of 265° F. The initial pressure of the steam was 100 lbs. per sq. in. What was its initial quality?

Saturated steam at 17 lbs. has a temperature of 219° F.; the superheat in the calorimeter is consequently $265-219=46°$ F. The initial quality of the steam is seen by inspection to be .987.

Hirn's Analysis

In making Hirn's analysis of the performance of a steam engine it is necessary to find (from the measured pressure, volume, and weight of steam acting) the internal energy of the steam in the cylinder at admission, cut off, release, and compression. These quantities are readily found by the method already outlined.

Temperature-Entropy Diagram

In redrawing an indicator (pressure-volume) diagram on the temperature-entropy plane, the assumption is made that the whole of the working substance remains in the cylinder throughout the cycle, and that heat is added to and abstracted from it while it is in the cylinder. That is, the boiler, cylinder, and condenser operations are all assumed to take place in the cylinder. It is most convenient, moreover, to draw the diagram for unit mass of steam, which is readily done after determining the proper scale of volumes for the indicator diagram. The process then becomes extremely simple: the temperature and entropy corresponding to a series of points on the indicator diagram are found as in example 4 and are plotted. It should be noted, however, that the diagrams do not give information for qualities below about .7. Consequently some of the points on the temperature-entropy diagram must be calculated.

Other Problems

Many special problems of less common occurrence than the foregoing can be easily solved by the use of the diagrams. For example, suppose it is proposed to spray into a gas-engine cylinder a certain weight of water at a certain instant, and it is desired to know what will be the resulting pressure and temperature in the cylinder. The partial pressure, temperature and total heat of the steam formed will be represented by the coördinates of some point on a definite constant specific volume line on Diagram II; the exact position of the point on the line can easily be determined from the conditions of the problem by trial and interpolation.

PART III

DISCUSSION OF SOURCES

THE computation of a steam table requires as its foundation experimental data of several different kinds. The most important are:

1. An evaluation of the absolute thermodynamic scale;
2. Data on the variation of the specific heat of water with temperature;
3. Data on the mechanical equivalent of heat;
4. Data on the pressure-temperature relation for saturated steam;
5. Data on the specific heat of superheated steam;
6. Data on the specific volume of superheated steam;
7. Data on the total heat of saturated steam.

Each of these subjects will be discussed in a separate section. Besides them one needs:

A comparison of the fundamental units of length and of weight in the English and metric systems;

Data on the density of water at various temperatures;

A value for the density of mercury at the temperature of melting ice.

In each of these last three cases there are trustworthy values so generally accepted as to need no discussion.

§ 1. Absolute Temperature

An evaluation of the absolute thermodynamic scale is necessary because of the use which must be made of absolute temperatures in the computation of entropies. Two distinct problems are involved. The first is the determination of the absolute temperature of melting ice, that is, the location of the absolute zero; and the second is the determination, degree by degree, of the difference between the absolute scale and that of the nitrogen-in-glass thermometer which is the usual standard in scientific work. For the present purpose the second of these problems need not be considered, for the variation of the nitrogen thermometer from the absolute scale is nowhere greater than a twentieth of a degree Fahrenheit between 0° and 400°; above 400° even considerably larger errors in the temperature scale would be within the limit of error of the rest of the experimental data.

The determination of the absolute zero has recently been most satisfactorily accomplished. Three papers may be mentioned, which will themselves give references to many more, namely those of Berthelot,[1] Buckingham,[2] and Rose-Innes.[3] Berthelot worked by two very different methods, the first based on the fact that as the pressure

[1] Trav. et Mém. Bur. Int., vol. 13 (1903).
[2] Bul. of the Bur. of Stan., vol. 3 (1907), pp. 237–293 (Reprint No. 57).
[3] Phil. Mag. (6), vol. 15 (1908), pp. 301–316.

in a gas thermometer approaches zero, the gas becomes more and more perfect, and the second based on the Joule-Thomson effect. Buckingham worked only from the Joule-Thomson effect. Rose-Innes also used the Joule-Thomson observations, but supplemented them as far as possible by much more accurate recent data on coefficients of expansion. The values which these investigators give for the temperature of the ice-point are: —

Author	Year	Method	Gases	Final Value for Ice-point
Berthelot	1903	Extrapolation to p=0	H_2 and N_2	491.54° F.
"	1903	Joule-Thomson effect	H_2, N_2, CO_2 and air.	491.63
Buckingham	1907	" " "	" " " " " "	491.71
Rose-Innes	1908	J.-T. effect and other data	H_2 and N_2	491.64

Of these values the last is probably the best. Incidentally, it agrees almost exactly with the mean of the other three. Since the temperature of melting ice on the ordinary Fahrenheit scale is 32°, the value that must be added to temperatures on the ordinary scale to reduce them to absolute temperatures is

$$491°.64 - 32°.00 = 459°.64.$$

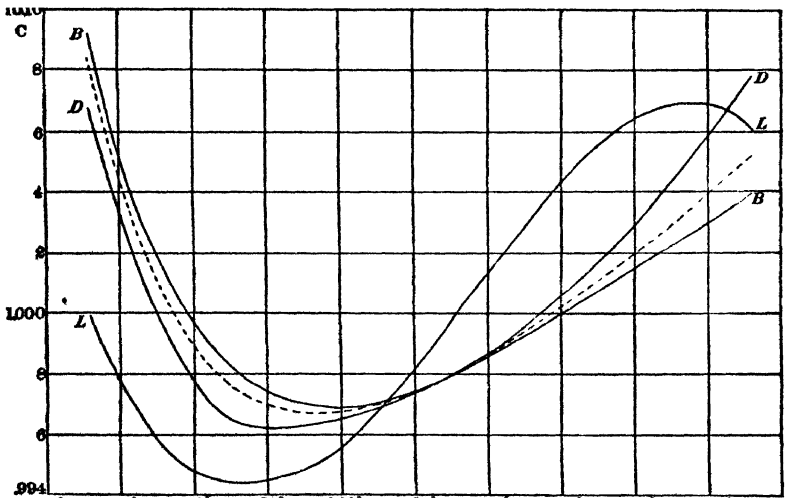

Fig. 1. — The specific heat of water between the freezing and boiling points according to Barnes (*B*), Dieterici (*D*) and Lüdin (*L*). The dotted curve is $(2B + D)/3$.

§2. The Variation of the Specific Heat of Water with Temperature

The only sets of experiments available over the whole range from 32° to 212° F. are those of Lüdin,[1] Barnes,[2] and Dieterici.[3] Since this part of the discussion is concerned only with the shape of the curve of variation of the specific heat, c, with tem-

[1] Inaug. Diss., Zurich, 1895: recomputed, Fortsch. d. Phys. vol. 56II (1900), p. 304.
[2] Phil. Trans., vol. 199A (1902), pp. 149–263.
[3] Wied. Ann., (4) vol. 16 (1905), pp. 593–620.

perature, and not with its height, the actual values of each of these observers have been multiplied by such a constant as to make the average value of c between 32° and 212° exactly 1. This is equivalent to expressing each set of values in terms of the well-known Bunsen or mean calorie, if the temperatures are on the Centigrade scale, or in terms of a corresponding mean B.t.u., if the temperatures are on the Fahrenheit scale. The resulting curves are shown in Figure 1. Lüdin's values are generally regarded as the least trustworthy, partly because of the difficulties inherent in calorimetry by the method of mixtures, and partly because his maximum just below the boiling point is not corroborated by either of the other observers, or by Regnault, either for water or for any other liquid. Of the other two pieces of work, Dieterici's is not as convincing as the extraordinarily good work of Barnes as regards either perfection of method or consistency of results. Barnes' values have therefore been given most weight in arriving at a representative curve. Lüdin's values have been given no direct weight whatever, but the fact that his curve and Dieterici's both differ from that of Barnes in the same direction throughout encourages one to give to Dieterici's values rather more weight in comparison with Barnes' than might otherwise have seemed desirable.[1] The values finally chosen are a mean between those of Barnes and those of Dieterici, giving the former twice as much weight as the latter. The curve representing these mean values is dotted in Figure 1, and its ordinates are tabulated in the sixth column of Table 6 at the end of Part I of this book. The values there given for temperatures below the freezing point are from the work of Barnes and Cooke.[2] The values of the heat of the liquid, in Tables 1, 2 and 3, were obtained by a step by step, numerical evaluation of the integral $h = \int_{32}^{t} c\, dt$.

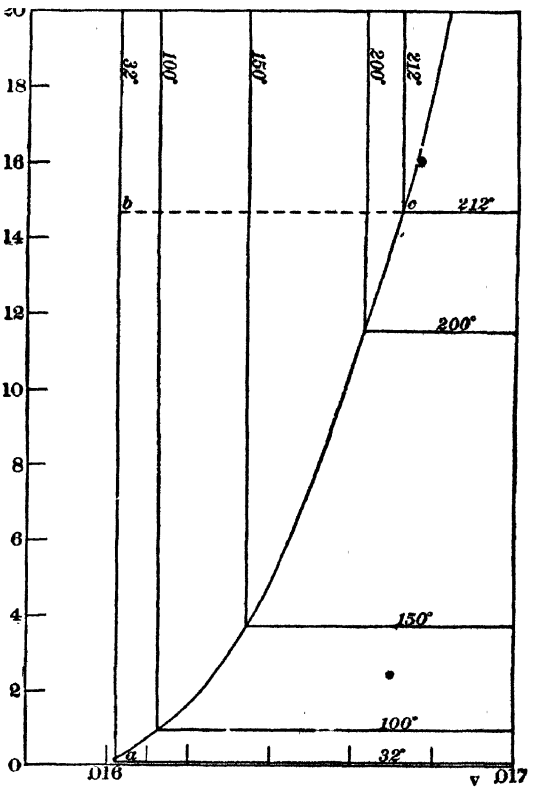

FIG. 2. — A large scale drawing of a piece out of the lower left-hand corner of the steam dome on the ordinary pv plane, illustrating the meaning of "the heat of the liquid." Abscissæ are in cu. ft.; ordinates are in lbs. per sq. in.; temperatures are on the Fahrenheit scale.

[1] See also p. 91.

[2] Phys. Rev., vol. 15 (1902), pp. 65–72.

It should be noticed that between 32° and 212° F. there are two theoretically distinct sets of numbers which could properly be given under the heading "the heat of the liquid" in a steam table, according to whether water at 32° and atmospheric pressure, or water at 32° and the pressure of its saturated vapor, is used as the zero of total heat. Figure 2 represents, drawn to scale, but much magnified, the lower left-hand corner of the steam dome on the usual pv plane. According to the first scheme, water at the point b is chosen as the zero of total heat, and the values of h which correspond to temperatures between 32° and 212° are those along the line bc. According to the second scheme, water at the point a is the zero of total heats, and the values of h given are those along the water-line ac. Since the internal energy, e, of water at b is very nearly the same as that of water at a, practically all of the difference between the h at b and the h at a comes in the second term of the usual equation

$$h = e + 144\ Apv.$$

Graphically, this difference is the equivalent in heat units of the area of the rectangle between the vertical line ab of Figure 2 and the p axis; and in general the difference between the two possible values of h at any temperature is the area of a similar rectangle to the left of some vertical line between ac and bc.

A comparison of the two possible sets of h values with each other, and with the values of e along the same two lines, is given in the following table. The "mean B. t. u.," which is the heat unit employed, is, by definition, the one hundred and eightieth part of the change in total heat along bc.

Description	Value at 32°	Value at 212°	Range
e along ac	0.00000	179.99813	179.99813
e along bc	0.00002	179.99813	179.99811
h along ac	0.00026	180.04362	180.04336
h along bc	0.04362	180.04362	180.00000

The distinction between the two possible sets of h values is of practical importance only in accurate calorimetry by the method of mixtures, and for that purpose h values along bc are preferable. They are given to two decimal places in Table 1 to facilitate this use of them. As a matter of convenience they have been reduced to b as the zero state, and satisfy the unusual but equally permissible equation of definition

$$h = e + 144\ Apv - 0.04362$$

At high temperatures only values on the second scheme are possible, so that, in careful thinking, different interpretations of the phrase "heat of the liquid" are necessary in different temperature ranges.

Above 212° there are available only two investigations, Dieterici's and Regnault's.[1] The latter's observations were by the method of mixtures, the mean temperature of the cold water in the calorimeter varying from 55° to 70° F. Since the specific heat of

[1] Mém. de l'Inst. de France, vol. 21 (1847), pp. 729–748.

water changes rapidly with the temperature in that range, it has seemed worth while to recompute Regnault's results on the basis of the curve just obtained for c below 212°. Figure 3 shows on a large scale the difference between the recomputed heat of the liquid from Regnault's data and that on the assumption that c is constant and equal to one. In other words, ordinates in Figure 3 are the increments that must be added to the mere temperature difference $(t-212)$ to give, for any temperature t, the heat of the liquid above that at 212°. The curve R, representing Regnault's observations, does not approach zero at 212° as it should, which means that Regnault's experiments are inherently inconsistent with the c curve adopted above for the range from 32° to 212°. Regnault's experiments require the curve to be lower at room tempera-

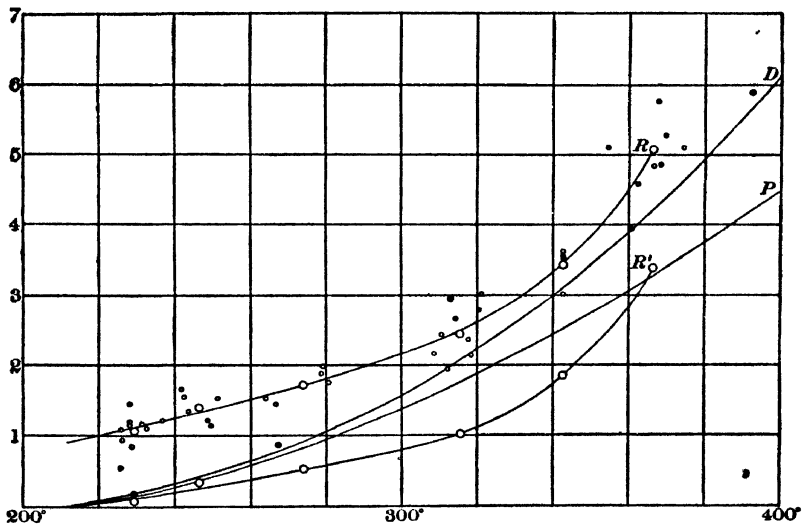

FIG. 3. — The heat of the liquid (h) above the boiling point. Abscissæ are temperatures on the Fahrenheit scale. Ordinates are Δh in B. t. u. where Δh is what must be added to $(t-32)$ to give h. The recomputed results of Regnault's forty experiments are represented by small circles, and their means, in six groups, by large circles (curve R); curve R' is curve R scaled down to pass through 0 at $t=212°$. Curve P is Peabody's recomputation of Regnault's curve, also scaled down to pass through 0 at $t=212°$. Curve D represents Dieterici's formula and is the one used in this book. The black dots are five of Dieterici's twenty experimental means. The middle one of the five shown is the most inconsistent of the whole twenty. Dieterici's formula represents fairly well his other values at temperatures above 400° F.

tures and consequently higher near the boiling point than is the mean curve chosen above — that is, they require a curve still more like Dieterici's and still less like Barnes' than that chosen, thus justifying the decision that Dieterici's results should have a weight of at least one in three. Perhaps they should have had even more weight, but the work of Barnes has always been regarded as of such extraordinary excellence that this has not seemed best at the present time.

If Regnault's values are multiplied by such a constant factor as will make them approach zero at 212°, his curve lies below either Dieterici's or that marked P in Figure 3,

which represents Peabody's version of Regnault's experiments,[1] but turns sharply up across Peabody's curve toward Dieterici's near 400° F. The arbitrary nature of this scaling-down process is, however, an argument against the acceptance of the resulting curve.

Dieterici's curve is also open to objection in that his observed points do not lie as near it as might be wished, especially in the temperature range of Figure 3. The position of his curve is fixed largely by the points at higher temperatures.

The whole subject is still, therefore, in an unsatisfactory condition above 212°. Fortunately it makes very little difference in the properties of saturated steam which values are used for the heat of the liquid. For instance, the whole of the outstanding discrepancy at 400° would make about a thirtieth of one per cent difference in the entropy of saturated steam at that temperature. The values of Dieterici above 212° have, therefore, been chosen because of the great range covered by his experiments, even though this involves a slight discontinuity in $dh/dt=c$ at 212°. His formula for the mean specific heat from 32° F. to t° F. may be written

$$c_m=0.9983-0.000\,028\,8(t-32)+0.000\,002\,133(t-32)^2 \text{ mean B. t. u.}$$

Strictly speaking, this formula leads to values, not of h, but of e, but the difference is, in general, smaller than the outstanding uncertainties in either, being 0.046 B.t.u. at 212°, about 0.2 B.t.u. at 300°, and only 0.85 B.t.u. at 400°. Neglecting it, as has been done in these tables at temperatures below 450°, simply means using as standard a compromise (namely curve D on Figure 3) between the true Dieterici curve, which would lie somewhat higher than curve D, and Regnault's results as represented by either curve R or curve P. Above 450°, where the difference between e and h gets big, it has been allowed for.

§3. The Mechanical Equivalent of Heat

The values of the specific heat of water discussed in the last section are in thermal units; some one of them must now be determined in mechanical units. For this purpose there are available the experiments of Rowland,[2] and of Reynolds and Moorby,[3] by whom mechanical work was transformed directly into heat, and the experiments of Griffiths,[4] of Schuster and Gannon,[5] and of Barnes,[6] by whom electrical energy was changed into heat. These investigations have recently been discussed by Smith,[7] who accepts as most trustworthy the mean of the values of Reynolds and Moorby and of Barnes, namely

$$1 \text{ mean calorie} = 4.1834 \times 10^7 \text{ ergs.}$$

[1] Reduced to mean B.t.u. by subtracting a seventh of one per cent.
[2] Proc. Amer. Acad., vol. 15 (1880), pp. 75–200.
[3] Phil. Trans., vol. 190A (1898), pp. 301–422.
[4] Phil. Trans., vol. 184A (1893), pp. 361–504.
[5] Phil. Trans., vol. 186A (1895), pp. 415–467.
[6] Phil. Trans., vol. 199A (1902), pp. 149–263.
[7] Monthly Weather Review, October, 1907.

To change this into English units, one needs the conversion factor[1]

$$1 \text{ kg.} = 2.204622 \text{ lbs.}$$

and a value of the gravitation constant g for which

$$g = 980.665 \text{ cms. per sec.}^2$$

has been adopted as standard by international agreement.[2] The result is

$$1 \text{ mean B. t. u.} = 777.54 \text{ standard ft. lbs.}$$

This value has been used in these tables.

§4. Pressures and Temperatures of Saturated Steam

The classical experiments on this subject were performed by Regnault[3] in the year 1847, and are even now models of accuracy. They covered the range from $-27°$ to 363° F. They have been recomputed with slightly varying results by several authors, among whom are Broch,[4] Peabody,[5] and Henning.[6] Since Regnault's time, many other investigations have been published, eleven of which are carefully discussed by Henning.[7] He uses as a standard of reference a formula of Thiesen,[8] which expresses p in mms. of mercury (at 0° C.) as a function of t in degrees Centigrade, as follows: —

$$(t+273) \log \frac{p}{760} = 5.409\,(t-100) - 0.508 \times 10^{-8}\,((365-t)^4 - 265^4).$$

The deviations, from this formula, of Regnault's observations and of those of the eleven later investigators are plotted on a large scale in Henning's paper, and a correction curve for the formula obtained graphically. The conclusions reached in this paper were the basis of the original computations for these tables. The use of Thiesen's formula is greatly facilitated by a table in Henning's paper, giving p in mms. of mercury for every degree from 0° to 200° C.

More recently, in August, 1908, Holborn and Henning have published the results of new experiments at the Reichsanstalt covering the range from 125° to 400° F. with extraordinary precision, and have proposed a new correction curve for Thiesen's

[1] See Fischer, Bul. of the Bur. of Stan., vol 1 (1904–5), p. 380.

[2] Troisième Conf. gen. des poids et mes., 1901, pp. 66–68.

[3] Mém. de l'Inst. de France, vol. 21 (1847), pp. 465–633; for a most excellent account in English of these experiments see Risteen, The Locomotive, published by the Hartford Steam Boiler Inspection and Insurance Co., vol. 26 (July, 1906), pp. 85–94.

[4] Trav. et Mém. Bur. Int., vol. 1A (1881), pp. 19–39.

[5] Steam Tables, 7th ed. (1907), pp. 2–6.

[6] Wied. Ann., (4) vol. 22 (1907), pp. 609–630.

[7] Loc. cit.; see also Risteen, The Locomotive, vol. 26 (1907), pp. 183–190, 246–254; and vol. 27 (1908), pp. 54–62.

[8] Wied. Ann., N. F., vol. 67 (1899), p. 692.

formula based on their own work down to 125° F. and on Thiesen's experiments near the freezing point. Above 212° the new curve, Henning's 1907 curve, and the curve which represents Henning's recomputation of Regnault's observations, all agree within a twentieth of a degree Fahrenheit, so that the pressure-temperature relation may be regarded as satisfactorily known. Below 212° the new saturation temperatures run slightly higher than those of the 1907 paper, the greatest change being 0.12° F. at a pressure of 1 lb. Those parts of the tables which are affected by the change have been recomputed and corrected in page proof.

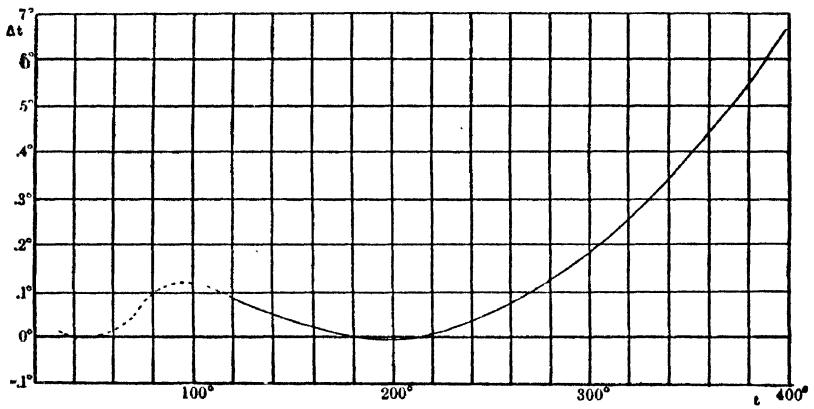

FIG. 4. — Correction curve for Thiesen's formula, according to Holborn and Henning (1908). Abscissæ are temperatures; ordinates are $\Delta t = t_{obs.} - t_{calc.}$

To make Thiesen's formula available in English units, one needs the density of mercury at 0° C. According to Thiesen and Scheel [1]

1 cu. cm. of Hg. at 0° C. weighs 13.59545 grs.

In the computation of the condenser vacuum column in Table 1, giving p in inches of mercury, one needs also

1 meter = 39.37 U. S. standard inches.[2]

Thiesen's formula, expressed in English units, is

$$(t+459.6)\log\frac{p}{14.70} = 5.409\,(t-212) - 8.71\times 10^{-10}\,((689-t)^4 - 477^4),$$

where p is in lbs. per sq. in. and t is in ordinary Fahrenheit degrees. The correction curve of the 1908 paper of Holborn and Henning is plotted in English units in Figure 4, in which ordinates are Δt = observed temperature minus the t in Thiesen's

[1] Z. S. f. Instrkde., vol. 18 (1898), p. 138.

[2] This is the legal definition of the U. S. standard inch. See Fischer, Bul. of the Bur. of Stan. vol. 1 (1904–5), pp. 365–381, particularly p. 380.

formula. To use this curve to get the pressure corresponding to a given temperature $t°$, one first *subtracts* from that t the Δt given by the curve, and then substitutes the remainder in Thiesen's formula.

At the very high temperatures considered at the end of Table 1, three researches are available, namely those of Battelli,[1] of Cailletet and Colardeau,[2] and of Knipp.[3] The results of these observers are not in good agreement, as the following table shows. The values of Cailletet and Colardeau were used in the preparation of Table 1.*

Temp. Fahr.	Pressure in Atmospheres According to Battelli	C and C.	Knipp
400°	16.8	16.8	
500°	48.6	46.6	47.1
600°	109.7	107.1	112.5
680°	186.7	189.0	207.7

§5. The Specific Heat of Superheated Steam

Here, as before, the classical research is that of Regnault,[4] published in the year 1862. Contrary to an assumption sometimes seen in the literature, his work does not even seem to prove that the specific heat at constant pressure (C_p) of superheated steam is independent of either the pressure or the temperature, for he made only four series of experiments, and these were all at atmospheric pressure and covered nearly the same temperature range. He worked by the method of mixtures, injecting a known weight, first of slightly superheated steam, and then of highly superheated steam, into a calorimeter filled with water at room temperature. His computations are in error because, instead of weighing the cold water in the calorimeter, he measured it volumetrically in a suitable cast-iron tank. His justification of this was that although, by reason of the thermal expansion of the water as compared with that of the tank, there was less water by weight at room temperature than at 0° C., which was his standard temperature, nevertheless the fact (which he thought to be true at low as well as at high temperatures) that the specific heat of water increased with the temperature, made the water in the calorimeter more effective thermally, gram for gram, and just about made up for neglecting its change of density. But we now know that at room temperatures the specific heat of water decreases with rising temperature. His data have, therefore, been recomputed, using his own value for the expansion coefficient of his sheet-iron tanks and modern data for the density and specific heat of water. This slightly reduces each of his four values of C_p to the following figures: —

[1] Mem. d. R. Acc. d. Sc., Turin (2), vol. 43 (1892), pp. 63–98; see also Ann. de Chem. et de Phys. (6), vol. 26 (1892), pp. 410–425; and especially Risteen, The Locomotive, vol. 26 (October, 1906), pp. 116–126, and vol. 26 (July, 1907), pp. 213–219.

[2] Journ. de Phys. (2), vol. 10 (1891), pp. 333–340; also Ann. de Chem. et de Phys., vol. 25 (1892), pp. 519–534; also Physikalische Revue, vol. 1 (1892), pp. 14–21; also a short note in C. R. vol. 112 (1891), pp. 563–565; see Risteen, The Locomotive, vol. 26 (July, 1907), pp. 219–221.

[3] Phys. Rev., vol. 11 (1900), pp. 141–144.

[4] Mém. de l'Inst. de France, vol. 26 (1862), pp. 167–178.

* See page 4.

	Temp. Range ($C°$)	R's Value of C_p	New Value of C_p
Series 1.	127.7–231.1	(0.46881)[1]	(0.4655)
Series 2.	137.7–225.9	0.48111	0.4769
Series 3.	124.3–210.4	0.48080	0.4736
Series 4.	122.8–216.0	0.47963	0.4780
	Mean of last three	0.48051	0.4762

It will be seen presently that the new figures agree better with modern work than do the older ones.

It is only within a few years that reliable determinations of C_p at other pressures than 1 atmosphere have been made. The best of these are probably those of Knoblauch and Jakob,[2] which were carried out with great care by the electrical method. Steam from a boiler was superheated in an apparatus consisting of a long pipe some inches in diameter filled with a dense grid of resistance wire, wound on insulating frames. The energy necessary for superheating was introduced electrically in the first sections of this pipe and the rest of the resistance wire served to mix the steam and bring it into a homogeneous state. It then passed into a calorimeter where a small amount of additional energy was introduced electrically, careful measurements being made of the temperatures of the steam when entering and leaving this calorimeter. The losses due to radiation and conduction were determined by separate experiments. The C_p of the steam in the calorimeter could then be easily computed. The results of these experiments have been used as the basis for the computation of these tables.

They have, however, been modified in two respects. In the first place, the curve giving the C_p of steam at atmospheric pressure has been lowered in the high temperature region, so as to agree better with the values obtained by Holborn and Henning[3] at very high temperatures. Their work, like Regnault's, was only at atmospheric pressure, but they reached temperatures as high as 2450° F., and others by different methods have gone even higher. All these results agree in giving smaller values of C_p than an extrapolation of Knoblauch and Jakob's atmospheric curve would indicate. It has therefore been lowered so as to join continuously with the curve of Holborn and Henning.[4] The high

[1] "... les résultats de la première série, qui m'inspirent moins de confiance que les autres. ..." Regnault, p. 178.

[2] Forscharb., Berlin, Hefte 35 and 36 (1906), pp. 109–152.

[3] Wied, Ann., (4) vol. 18 (1905), pp. 730–756; and (4) vol. 23 (1907), pp. 809–845.

[4] (Note added, June, 1912). The propriety of this change in the original curve of Knoblauch and Jakob has been justified since the first copies of this book were printed by the results of a new investigation by Knoblauch and Mollier (Z. V. D. I., 1911, pp. 665–674) covering the same range of pressure as their earlier investigation, but extending to over 1000° F. This work shows that their former C_p curve for 1 atmosphere rose too sharply near 650° F. and that the true curve lies nearly as it was drawn in figure 5. Their results run a little higher, however, than Holborn and Henning's, and it is therefore possible that the values of C_p used in this book for the highest temperatures are a little too low. No error of commercial importance is involved.

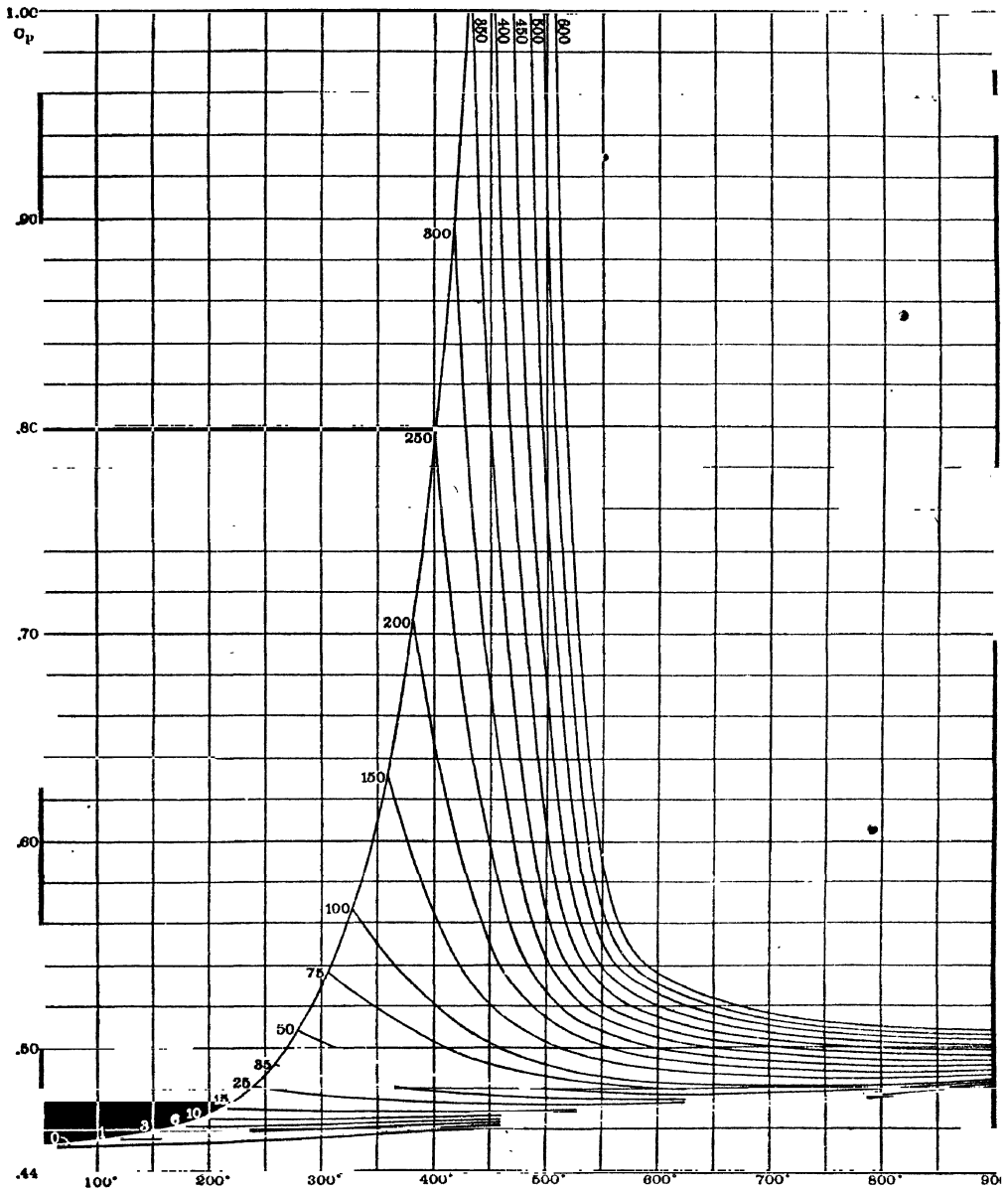

FIG. 5. — The specific heat at constant pressure of superheated steam as used in this book, extrapolated from Knoblauch's data. The saturation line is drawn according to his formula, and the curves at moderate pressures and superheats follow his curves as nearly as possible. The curves at very low pressures close to saturation are higher than Knoblauch's curves because of thermodynamic evidence, and because of Regnault's results at atmospheric pressure. The 15 lb. curve at high superheats follows Holborn and Henning's curve. The other curves are spaced at very high superheats in accordance with information derived from the Joule-Thomson effect.

temperature ends of the other curves, for pressure higher than 15 lbs., have then been spaced in accordance with information which can be derived from a study of the Joule-Thomson effect in superheated steam and in other vapors.[1]

The second modification of Knoblauch's curves is at the low temperature end of the 15 lb. curve and those near it. These run lower than even the recomputed results of Regnault's observations, to which considerable importance may well be attached in the present unsettled state of the subject. There are also certain theoretical considerations based on the thermodynamics of the Joule-Thomson effect which seem to set 0.45 as a lower limit to the lower end of the saturation line on the C_p diagram, a value also somewhat higher than Knoblauch's. For these reasons, the curves below 100 lbs. have all been slightly raised on the C_p diagram. The difference at 15 lbs. is only 0.007 B. t. u.

The finally accepted values of C_p, which were used in the preparation of these tables, are plotted in Figure 5. They have received additional confirmation from the fact that all of seven different kinds of large scale steam diagrams which have been plotted in the course of this work, and particularly the total heat-temperature diagram on which the lines of constant pressure seem to be very sensitive to inconsistencies in the assumed values of C_p, ran more smoothly with these values of C_p than with certain other suggested values which were first tried.

§6. The Specific Volume of Superheated Steam

Of the various sets of values of the specific volume of superheated steam at different pressures and temperatures, that of Knoblauch, Linde and Klebe [2] seems to be the best, and has been used in this work.[3] Linde's characteristic equation,[4] expressing v as a function of p and t, may be written

$$pv = 0.5962\ T - p\,(1 + 0.0014\ p)\left(\frac{150{,}300{,}000}{T^3} - 0.0833\right),$$

where p is in lbs. per sq. in., v is in cu. ft., and $T = t + 459.6$ is the absolute temperature on the Fahrenheit scale.

§7. The Total Heat of Saturated Steam

It is in their values for the total heat of saturated steam that these tables differ most essentially from all that have preceded them. It has been the custom for makers of steam tables to use Regnault's classic formula,[5] now sixty-one years old, which gives as the total heat of saturated steam

$$H = 1091.7 + 0.305\ (t - 32).$$

[1] Davis, Proc. Am. Acad., vol. 44 (1909).
[2] Forscharb., Berlin, Heft 21 (1905), pp. 33–55.
[3] But see p. 103.
[4] Forscharb., Berlin, Heft 21 (1905), pp. 64–69.
[5] Mém. de l'Inst. de France, vol. 21 (1847), pp. 635–728.

It has for some time been known that this formula was considerably in error, especially at low temperatures, and it is worth noticing that of the eight other vapors studied by Regnault, five gave curves of the second degree, concave downward, for H as a function of t.

Since Regnault's time, measurements of great value, either of the total heat itself, or of the heat of vaporization, which amounts to the same thing, have been made at various temperatures between 32° and 212° F. by Dieterici, Smith, Griffiths, Henning and Joly, all of which have been admirably discussed by Smith in the paper previously referred to.[1] Their values as recomputed by him are given in the following table:—

Observer	Temperature Degrees Fahr.	Total Heat B. t. u.
C. Dieterici, Königl. Tech. Hochschule, Hanover, Germany. Wied. Ann., vol. 37 (1889), pp. 494–508.[2]	32.0	1073.4
A. W. Smith, University of Michigan, U. S. A. Phys. Rev., vol. 25 (1907), pp. 145–170.	57.1	1084.7
	70.1	1090.7
	82.5	1096.2
	103.6	1104.6
E. H. Griffiths, Cambridge, England. Phil. Trans., vol. 186A (1895), pp. 261–341.	86.0	1097.8
	104.3	1104.9
	76.9	1094.5*
	103.9	1104.2*
	121.7	1111.2*
F. Henning, Reichsanstalt, Berlin, Germany. Wied. Ann., (4) vol. 21 (1906), pp. 849–878.	86.2	1097.6*
	120.5	1114.4
	148.7	1124.7
	171.2	1134.5
	192.7	1144.0
	213.1	1151.1
J. Joly, Trinity College, Dublin, Ireland. In an appendix to Griffiths' paper above (p. 322).	211.9	1150.0

* These four values were considered by the experimenters less reliable than their other results.

These values have been plotted on a large scale and a graph drawn representing satisfactorily practically all of them, from which the values used in this book at temperatures below 212° were then read off. Regnault's formula, and those tables which are based on it, are right at 170° F., but are too high by 18 B. t. u. at 32° F.

Above 212°, Regnault's values may be replaced by a second degree equation recently proposed by one of the present authors [3] on the basis of a recomputation of the throttling experiments of Grindley, Griessmann and Peake, with the help of the C_p measurements of Knoblauch and Jakob, already referred to. The method used is illustrated by Figure 6, the left-hand half of which represents a throttling curve of the

[1] Monthly Weather Review, October, 1907.
[2] See also Wied. Ann., (4) vol. 16 (1905), pp. 593–620.
[3] Davis, Proc. Am. Soc. of Mech. Engs., vol. 30 (November, 1908), pp. 1419–1432.

sort published in the papers mentioned. Supposedly dry and saturated steam at the pressure and temperature corresponding to the point A is first throttled to a lower pressure and temperature corresponding to the point B; then in a later experiment in the same run, it is throttled from exactly the same initial condition A to the condition C; then to D and so on. The well-known law of throttling is that the total heat in the condition B, or C, or D, is equal to that in the initial condition A.

The point B represents superheated steam at the pressure p_B; the point B' represents saturated steam at the same pressure; the amount of superheat at B is the known temperature there minus the temperature at B', which can be taken from a steam table. Also, by definition, the total heat at B equals that of saturated steam at the same pressure (point B') plus the amount of heat required to superheat it at constant pressure from B' to B. This is the integral of C_p from B' to B, or simply the mean C_p from saturation multiplied by the known superheat. If C_p is known, this integral or increment in the total heat between B' and B is easily evaluated.

The value obtained is not only the difference between the total heat of saturated steam at B' and that of superheated steam at B; it is also the difference between the total heat of saturated steam at B' and that of saturated steam at A; that is, between the two corresponding ordinates of a curve giving the total heat of saturated steam as a function of the temperature. To draw a piece of this curve, one chooses arbitrarily some horizontal line such as xy in Figure 6, and lays off below it, at the proper temperatures, the distances bb', cc', dd', etc., which represent on the desired H-scale the integrals or total heat differences between B' and B, C' and C, D' and D, etc. The curve $ab'c'd'$ is an isolated piece of the true curve of total heat against temperature. The *relative* height of its points, that is, its shape, is accurately determined; its *absolute* height above the assumed zero of total heat, namely, water at 32° and atmospheric pressure, is not yet known.

In the paper referred to, twenty-four overlapping pieces of this sort were superposed and gave a well-defined curve. Its height was then so determined as to make it pass through the mean of the values near the boiling point of Henning and of Joly, each reduced to 212°. The resulting curve leads to the formula

$$H = 1150.3 + 0.3745(t-212) - 0.000550(t-212)^2.$$

It agrees satisfactorily, in the range from 212° to 400° F., with the values which Linde [1] computes from the volume measurements of Knoblauch, Linde and Klebe, and also with the values recently proposed by Henning [2] on the basis of an extrapolation of a formula representing his results below 212°.[3] It is certainly much better than Regnault's formula, and is probably within a tenth of one percent of the truth throughout the range considered. If it be even that much in error, it is probably because it runs too low at the high temperatures. It has been used for the range above 212° in these

[1] Forscharb., Berlin, Heft 21 (1905), pp. 69–72.
[2] Wied. Ann., (4) vol. 21 (1906), p. 870.
[3] See also Peabody, Proc. Am. Soc. of Mech. Engs., vol. 31 (1909).

tables. It shows that Regnault's formula, and those tables which are based on it, are too high by 6 B.t.u. at 175°, are right at 280°, and are too low at higher temperatures, the error increasing as the square of $(t-175)$.

It has been pointed out [1] that the "total heat of saturated steam" obtained in this way is, rigorously, slightly different from that measured by Regnault. The new H is defined by the equation already mentioned in section 2,

$$H=E+144\ Apv-0.04 \quad \text{mean B.t.u.},$$

where E is the internal energy of the saturated steam and v is its volume. Regnault's H was smaller by the amount of the feed-pump work required to force water *at the*

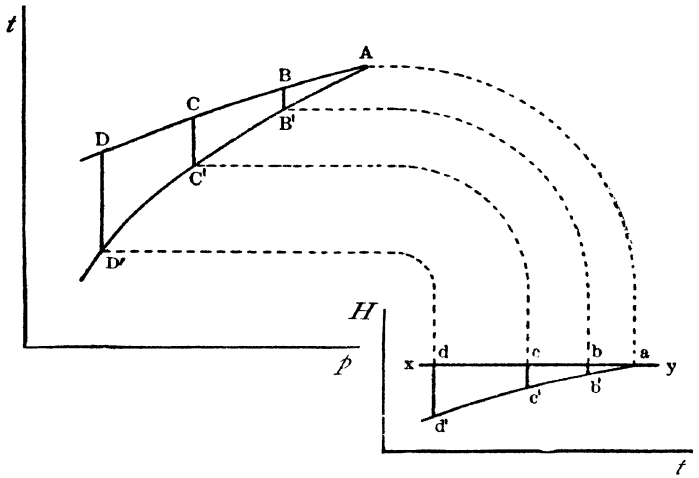

FIG. 6. — Showing how the total heat curve $ab'c'd'$ is obtained from a throttling curve, $ABCD$.

temperature of the room into an enclosure against the pressure of the high temperature steam under investigation. Regnault's H gives accurately the heat required to turn feed water under pressure at *his* room temperature into steam in the delivery pipe, but is not as useful for other purposes as the H defined above; furthermore, it is not an accurately definable concept, depending as it does not only on the temperature of the saturated steam itself, but also on the temperature of the feed water. It is desirable, therefore, to displace it in both scientific and technical thinking by an H defined as above. This is the usual practice abroad.

From H it is easy to compute L, the latent heat of evaporation, by subtracting h, the heat of the liquid.

$$L=H-h.$$

In many places in Tables 1 and 2, the values given for H, h and L will fail to satisfy this equation by one unit in the last place. This is because they were made to satisfy it when carried to an extra decimal place, the discrepancy coming in when the extra place was dropped.

[1] Heck, Jour. of the Am. Soc. of Mech. Engs., vol. 31 (1909), p. 301.

At the end of Table 1, an attempt has been made to obtain by an extrapolation at least a qualitative idea of the variation of L and H with temperature in the range between 400° and the critical point. For this purpose L is easier to work with than H, because its behavior at the critical temperature itself is definitely known, at least if the usually accepted ideas about the critical point are assumed to be correct. These demand that at that point $L=0$ and $dL/dt=$minus infinity. As to H, it can be proved on the same hypotheses that $dH/dt=$minus infinity, but no information can be obtained as to the value of H itself. The two assumed facts about L led Thiesen [1] to suggest as an empirical formula

$$L=C\ (t_k-t)^n,$$

where t_k is the critical temperature of water and C and n are constants to be determined experimentally. For n Thiesen used $\frac{1}{3}$, and Henning was led by his experiments below 212° F. to $n=0.31249$. A redetermination of this constant with the help of the new values above 212°, just described, leads to $n=0.3150$. If 138.81 B. t. u. be used for C, Thiesen's formula represents not only the seventeen values below 212° already tabulated, but also the eighteen mean values from which the new equation above 212° was obtained, with an average error of only one sixteenth of one per cent. It has, therefore, been used as the basis of an extrapolation to the critical point. The resulting values, which are given at the end of Table 1, are, of course, only qualitatively reliable. (See also page 4.)

§8. The Specific Volume of Saturated Steam

The adoption of a set of values for the total heat of saturated steam makes possible two useful computations. The first of these has already been mentioned on page 96, and gives C_p close to the saturation line by means of the formula [2]

$$C_p=\frac{dH}{dt}-\frac{L}{T}+\frac{L}{u}\left(\frac{dv}{dt}\right)_p.$$

The results of such a computation have been published elsewhere,[3] and seem to justify the decision that Knoblauch's values of C_p are preferable to Thomas'.

Of much greater importance is the possibility of computing u, the change of volume during vaporization, by means of Clapyron's equation, where p is in lbs. per sq. in.

$$u=\frac{L}{144AT}\ \frac{1}{(dp/dt)_{\text{sat.}}}.$$

The necessary values of dp/dt were obtained by the method suggested in Henning's 1907 paper, the derivative of Thiesen's formula for $p=f(t)$ being computed arithmetically, and an unimportant correction factor being obtained graphically from the

[1] Verh. Phys. Ges. zu Berlin, vol. 16 (1897), pp. 80–82.

[2] For derivation, see, for example, Griessmann, Forscharb., Berlin, Heft 13 (1904), p. 8.

[3] Davis, Proc. Am. Soc. of Mech. Engs., vol. 30 (November, 1908), pp. 1429–1431; and vol. 31 (February, 1909), pp. 309–310.

correction curve representing Henning's new results. To the values of u thus obtained must be added the specific volume, v', of water [1] to give the specific volume, v, of saturated steam.

The results differ considerably from those obtainable from Regnault's total heats (see curve R of Figure 7). They agree remarkably well with the actual measurements of Knoblauch, Linde and Klebe between 212° and 360° F. (see curve K of Figure 7), the discrepancy only once reaching 0.2%, which is the limit of error assigned by the experimenters to their work.

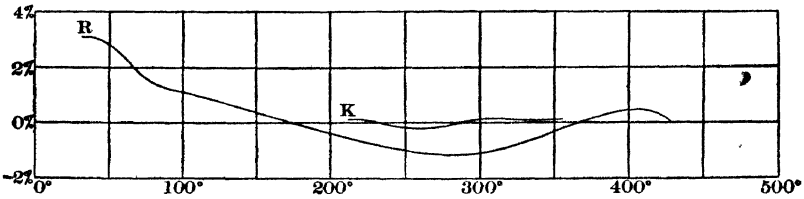

FIG. 7. — This figure shows the percentage deviation from the new values of the specific volume of saturated steam, first, of Regnault's values as given, for example, in the 1907 edition of Peabody's tables (curve R), and second of Knoblauch's experimental values (curve K). The irregularity below 100° is caused by the curious curvature in the lower part of the curve of Figure 4.

In Table 3 the values of v at saturation are the Clapyron values just described, while above 50° superheat, Linde's characteristic equation has been used. Between saturation and 50° superheat the values are such as to give a gradual transition. At high superheats Linde's equation is wholly an extrapolation, and the values of v should not be accepted with much confidence, the limit of error being uncertain.

§9. The Specific Volume of Steam at Very High Temperatures

The extrapolated values of the latent heat of vaporization discussed in section 6, together with the data on vapor tensions at very high temperatures discussed in section 4, make possible at least a qualitatively accurate computation, by Clapyron's equation, of the change of volume during vaporization up to and including the value $u=0$ at the critical point. Furthermore, the values of the specific volume of water in Landolt and Börnstein's tables run to about 600° F., so that up to that temperature the specific volume of saturated steam can be computed by the method used at ordinary temperatures.

Above 600° another device is furnished by a law proposed in 1886 by Cailletet and Mathias,[2] called "the law of the straight diameter." According to this law, if the means of the densities of a saturated vapor and its liquid at the same pressure and temperature are plotted (as abscissæ) against the corresponding temperatures (as ordinates), the resulting curve is so nearly straight and so nearly vertical up to and including the critical point itself, that its abscissa at even a somewhat uncertain

[1] The required values of the specific volume of water, v', were taken from the 3d (1905) edition of Landolt and Börnstein's "Physikalische Tabellen."

[2] Comptes Rendus, vol. 102 (1886), pp. 1202–1207; and vol. 104 (1887), pp. 1563–1568.

critical temperature is a very good determination of the critical density. This law has been experimentally verified for many different substances by Mathias, Young, Guye, Tsuruta and others.[1] It is found that the diameter is usually not exactly straight, but that a second degree equation

$$s = s_0 + at + bt^2$$

represents even the most exact experimental data with satisfactory accuracy, except in the case of the alcohols, which require an additional term in t^3. The method is now regarded as furnishing by far the best attainable value of the critical density of a substance.

The application of this law to water, which seems to be new, is illustrated in Figure 8. This figure shows not only the diameter itself (large circles), but also the vapor and liquid densities (small circles) of which its points are the means. The steam dome on this figure is analogous to that on the ordinary pv plane except that right and left are interchanged, and that the shape of the top is much flattened because of the crowding of a large pressure range into a small temperature range. The curvature in the diameter is noticeable but regular, and its points can be represented well within the limit of error of the data by the formula

$$s = 28.424 - 0.016\ 50(t-320) - 0.000\ 013\ 2(t-320)^2.$$

The substitution in this formula of the critical temperature, $t_c = 689°$ F., gives for the critical density and volume the values

$$s_c = 20.5 \text{ lbs. per cu. ft.},$$
$$v_c = 0.049 \text{ cu. ft. per lb.}^*$$

These may be compared with the only values previously reported, namely Battelli's[2] experimental value $s_c = 13.0$ lbs. per cu. ft. (point B in Figure 8), Nadejdine's[3] experimental value $s_c = 26.8$ lbs. per cu. ft. (point N in Figure 8), and Dieterici's[4] value $s_c = 15.5$ lbs. per cu. ft. (point D in Figure 8). Neither of the experimental methods of the first two observers is, in general, comparable with that of Cailletet and Mathias for the accurate determination of a critical volume, although each is admirably adapted to the determination of a critical pressure. It is probable, therefore, that the new value of the critical density is much better than either of the older experimental ones. Dieterici's value was computed on the basis of Young's law that, for "normal sub-

[1] Mathias, Ann. de la Fac. des Sci. de Toulouse, 1892; C. R., vol. 115 (1892), pp. 35–38; Mém. de la Soc. Roy. des Sci. de Liege (3), vol. 2 (1899); Journ. de Phys. (4), vol. 4 (1905), pp. 77–91.
Young, Journ. of the Chem. Soc., vol. 63, trans. (1893), pp. 1237–1240; Phil. Mag., vol. 34 (1892), pp. 503–507; and vol. 50 (1900), pp. 291–305.
Guye, Archives des Sci. Phys. et Nat. (3), vol. 31 (1894), pp. 43–46.
Tsuruta, Phys. Rev., vol. 10 (1900), pp. 116–118.
See also Young's "Stoichiometry," Longmans, 1908, pp. 165–170.

[2] Mem. dell. Ac. di Torino, (2) vol. 41 (1890), pp. 25–78; Physikalische Rev., vol. 2 (1892) pp. 1–32.

[3] Universitätskija Investia Kiew, vol. 6 (1885), pp. 32–33.

[4] Wied. Ann., (4) vol. 15 (1904), pp. 860–864.

* These values should now (1916) be $t_c = 706.1°$ F., $s_c = 20.1$ lbs. per cu. ft., $v_c = 0.050$ cu. ft. per lb.

stances," the ratio of the actual density at the critical point to that predicted by the gas law is very nearly the same for all substances, an average value being 3.7. The discrepancy between the experimental value just found and the computed value is of the same sort as the well-established discrepancies in the case of methyl and ethyl alcohol and of acetic acid, which are regarded as indicating the existence of double

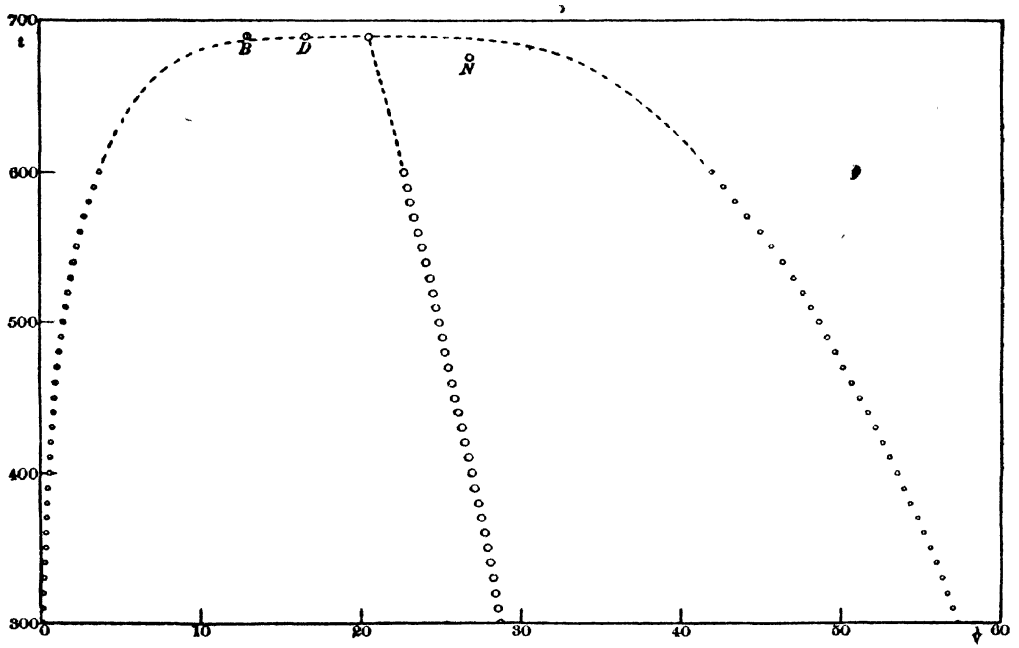

FIG. 8. — A determination by means of Cailletet and Mathias's law of the straight diameter of the critical volume of water and of the specific volumes of water and of steam at very high temperatures.

and triple molecules in those substances. A similar explanation in the case of water is very reasonable, since liquid water is known to be very highly associated at ordinary temperatures.

The equation for s, written above, gives at any temperature in the previously unknown range between 600° and 689° a value of

$$s = \frac{d_{st.} + d_{w.}}{2} = \frac{1}{2}\left(\frac{1}{v_{st.}} + \frac{1}{v_{w.}}\right).$$

Also Clapyron's equation gives a value of

$$u = v_{st.} - v_{w.}.$$

A simple algebraic manipulation of s and u gives both $v_{st.}$ and $v_{w.}$. The values at the end of Table 1 were obtained in this way. They are, of course, only qualitatively reliable because of the uncertainty in L and therefore in u.

§ 10. The Computation of the Tables

The processes by which the various values set down in the tables were obtained from these experimental data are in most cases obvious. In Tables 1 and 2, the first eight columns depend directly on the data selected. The ninth column, giving the internal energy of evaporation, comes from the formula

$$I=L-144\ Apu;$$

and the tenth column, giving the internal energy of saturated steam, from the corresponding formula

$$E=H-144\ Apv.$$

The entropy of the liquid, in column eleven, was computed by a step by step, numerical evaluation of the integral

$$n=\int_{32}^{t}\frac{c}{T}dt$$

up to 212°, and above 212° by an ordinary integration of Dieterici's second degree formula for c. The entropy of evaporation in column twelve is L/T. Column thirteen is the sum of columns eleven and twelve.

In all these cases, the required quantities were computed (usually to at least one extra significant figure) for each of a suitably selected set of standard pressures or temperatures, and the intermediate values filled in by interpolations involving, at times, differences of orders as high as the fifth. For such quantities as u and v, the interpolation is easier and more accurate if log u and log v are used instead of the quantities themselves.

In Table 3, the total heat and entropy increments from saturation at a number of standard pressures were computed by step by step numerical integrations of the C_p curves and the results plotted on a large scale. Smooth curves were then drawn for each of the superheats required and the increments read off for the intermediate pressures. A similar process was carried through for the specific volumes.

Since Holborn and Henning's observations on the C_p of superheated steam at atmospheric pressure run to very high temperatures, and since the spacing of the C_p curves for higher pressures is no more uncertain at 2000° superheat than at 600° superheat, it is possible to carry Table 3 to extremely high superheats with an accuracy limited chiefly by the errors already present below 600°. This has been done for several typical pressures in Table 4, and similar values for intermediate pressures can be obtained by interpolation.

The final values in all of the tables have been checked by the method of differences, by an independent computer, and as an additional precaution, many well-scattered numbers have been recomputed from the original formulæ by still another person not otherwise connected with the work. The authors will be glad to receive information as to any errors that may be discovered.